

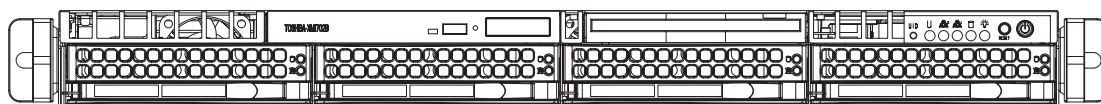
SUPER[®]

SUPERSERVER 5015M-UR

SUPERSERVER 5015M-U

SUPERSERVER 5015M-NTR

SUPERSERVER 5015M-NT



USER'S MANUAL

1.0d

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Preface

About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SuperServer 5015M-UR/5015M-U/5015M-NTR/5015M-NT. Installation and maintenance should be performed by experienced technicians only.

The SuperServer 5015M-UR/5015M-U/5015M-NTR/5015M-NT is a high-end server based on the SC815TQ-R450U/SC815TQ-560U 1U rackmount chassis and the PDSMU, a single processor serverboard that supports Intel® Xeon® 3000 Series, Pentium® D, Pentium Extreme Edition, Pentium 4, and Celeron D processors in an LGA775 Package at a Front Side (System) Bus speed of 1066/667/533 MHz and up to 8 GB of unbuffered ECC/non-ECC DDR2-667/533/400 SDRAM.

Manual Organization

Chapter 1: Introduction

The first chapter provides a checklist of the main components included with the server system and describes the main features of the PDSMU serverboard and the SC815TQ-R450U/SC815TQ-560U chassis, which comprise the SuperServer 5015M-UR/5015M-U/5015M-NTR/5015M-NT.

Chapter 2: Server Installation

This chapter describes the steps necessary to install the SuperServer 5015M-UR/5015M-U/5015M-NTR/5015M-NT into a rack and check out the server configuration prior to powering up the system. If your server was ordered without processor and memory components, this chapter will refer you to the appropriate sections of the manual for their installation.

Chapter 3: System Interface

Refer here for details on the system interface, which includes the functions and information provided by the control panel on the chassis as well as other LEDs located throughout the system.

Chapter 4: System Safety

You should thoroughly familiarize yourself with this chapter for a general overview of safety precautions that should be followed when installing and servicing the SuperServer 5015M-UR/5015M-U/5015M-NTR/5015M-NT.

Chapter 5: Advanced Serverboard Setup

Chapter 5 provides detailed information on the PDSMU serverboard, including the locations and functions of connections, headers and jumpers. Refer to this chapter when adding or removing processors or main memory and when reconfiguring the serverboard.

Chapter 6: Advanced Chassis Setup

Refer to Chapter 6 for detailed information on the SC815TQ-R450U/SC815TQ-560U server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring drives and when replacing system power supply modules and cooling fans.

Chapter 7: BIOS

The BIOS chapter includes an introduction to BIOS and provides detailed information on running the CMOS Setup Utility.

Appendix A: BIOS POST Messages

Appendix B: BIOS POST Codes

Appendix C: Intel HostRAID

Appendix D: Adaptec HostRAID Setup Guidelines

Appendix E: System Specifications

Notes

Table of Contents

Preface

| | |
|---------------------------|-----|
| About This Manual | iii |
| Manual Organization | iii |

Chapter 1: Introduction

| | |
|-----------------------------------|-----|
| 1-1 Overview | 1-1 |
| 1-2 Serverboard Features | 1-2 |
| 1-3 Server Chassis Features | 1-3 |
| 1-4 Contacting Supermicro | 1-6 |

Chapter 2: Server Installation

| | |
|---|------|
| 2-1 Overview | 2-1 |
| 2-2 Unpacking the System | 2-1 |
| 2-3 Preparing for Setup | 2-1 |
| Choosing a Setup Location | 2-2 |
| Rack Precautions | 2-2 |
| Server Precautions | 2-2 |
| Rack Mounting Considerations | 2-3 |
| 2-4 Installing the System into a Rack | 2-4 |
| 2-5 Checking the Serverboard Setup | 2-8 |
| 2-6 Checking the Drive Bay Setup | 2-10 |

Chapter 3: System Interface

| | |
|-----------------------------------|-----|
| 3-1 Overview | 3-1 |
| 3-2 Control Panel Buttons | 3-1 |
| UID | 3-1 |
| Reset | 3-1 |
| Power | 3-1 |
| 3-3 Control Panel LEDs | 3-2 |
| Universal Information LED | 3-2 |
| NIC2 | 3-3 |
| NIC1 | 3-3 |
| HDD | 3-3 |
| Power | 3-3 |
| 3-4 SATA Drive Carrier LEDs | 3-3 |

Chapter 4: System Safety

| | | |
|-----|-------------------------------------|-----|
| 4-1 | Electrical Safety Precautions | 4-1 |
| 4-2 | General Safety Precautions | 4-2 |
| 4-3 | ESD Precautions | 4-3 |
| 4-4 | Operating Precautions | 4-4 |

Chapter 5: Advanced Serverboard Setup

| | | |
|-----|--|------|
| 5-1 | Handling the Serverboard | 5-1 |
| 5-2 | Processor and Heatsink Installation | 5-2 |
| 5-3 | Connecting Cables | 5-5 |
| | Connecting Data Cables | 5-5 |
| | Connecting Power Cables | 5-5 |
| | Connecting the Control Panel | 5-6 |
| 5-4 | I/O Ports | 5-7 |
| 5-5 | Installing Memory | 5-7 |
| 5-6 | Adding PCI Cards | 5-9 |
| 5-7 | Serverboard Details | 5-10 |
| | PDSMU Layout | 5-10 |
| | PDSMU Quick Reference | 5-11 |
| 5-8 | Connector Definitions | 5-12 |
| | ATX Power Connector | 5-12 |
| | Processor Power Connector | 5-12 |
| | NMI Button | 5-12 |
| | Power LED | 5-12 |
| | HDD LED | 5-13 |
| | NIC1 LED | 5-13 |
| | NIC2 LED | 5-13 |
| | Universal Information LED | 5-13 |
| | Power Fail LED | 5-14 |
| | Reset Button | 5-14 |
| | Power Button | 5-14 |
| | Universal Serial Bus (USB0/1) | 5-14 |
| | Universal Serial Bus Headers | 5-15 |
| | Serial Ports | 5-15 |
| | Fan Headers | 5-15 |
| | Chassis Intrusion | 5-16 |
| | Speaker Connector | 5-16 |
| | ATX PS/2 Keyboard and PS/2 Mouse Ports | 5-16 |
| | Wake-On-LAN | 5-16 |

| | | |
|------|--|------|
| | Wake-On-Ring | 5-17 |
| | Power SMB Connector | 5-17 |
| | Power Supply Fail | 5-17 |
| | Alarm Reset | 5-17 |
| | LAN 1/2 (Ethernet Ports) | 5-18 |
| | Power LED | 5-18 |
| 5-9 | Jumper Settings | 5-19 |
| | Explanation of Jumpers | 5-19 |
| | CMOS Clear | 5-19 |
| | VGA Enable/Disable | 5-19 |
| | LAN Enable/Disable | 5-20 |
| | Watch Dog Enable/Disable | 5-20 |
| | Power Force On Enable/Disable | 5-20 |
| 5-10 | Onboard Indicators | 5-21 |
| | LAN1/2 LEDs | 5-21 |
| | LE1 | 5-21 |
| | PWR_LED | 5-21 |
| 5-11 | Floppy, IDE and SATA Drive Connections | 5-22 |
| | Floppy Connector | 5-22 |
| | IDE Connector | 5-23 |
| | SATA Ports | 5-23 |

Chapter 6: Advanced Chassis Setup

| | | |
|-----|---|------|
| 6-1 | Static-Sensitive Devices | 6-1 |
| 6-2 | Control Panel | 6-2 |
| 6-3 | System Fans | 6-3 |
| | System Fan Failure | 6-3 |
| | Replacing System Fans | 6-3 |
| 6-4 | Drive Bay Installation/Removal | 6-4 |
| 6-5 | Power Supply | 6-9 |
| | 5015M-UR/5015M-NTR: Power Supply Failure | 6-9 |
| | 5015M-UR/5015M-NTR: Removing/Replacing the Power Supply | 6-9 |
| | 5015M-U/5015M-NT: Power Supply Failure | 6-10 |
| | 5015M-U/5015M-NT: Removing/Replacing the Power Supply | 6-10 |

Chapter 7: BIOS

| | | |
|-----|-----------------------|-----|
| 7-1 | Introduction | 7-1 |
| 7-2 | Running Setup | 7-2 |
| 7-3 | Main BIOS Setup | 7-2 |

| | | |
|-----|----------------------|------|
| 7-4 | Advanced Setup | 7-6 |
| 7-5 | Security | 7-16 |
| 7-6 | Boot | 7-17 |
| 7-7 | Exit | 7-18 |

Appendices:

Appendix A: BIOS POST Messages

Appendix B: BIOS POST Codes

Appendix C: Intel HostRAID

Appendix D: Adaptec HostRAID Setup Guidelines

Appendix E: System Specifications

Notes

Chapter 1

Introduction

1-1 Overview

The 5015M-UR/5015M-U/5015M-NTR/5015M-NT is a 1U server comprised of two main subsystems: the SC815TQ-R450U (5015M-UR/5015M-NTR)/SC815TQ-560U (5015M-U/5015M-NT) chassis and the PDSMU single processor serverboard. Please refer to our web site for information on operating systems that have been certified for use with the server (www.supermicro.com). In addition to the serverboard and chassis, various hardware components have been included with the system, as listed below:

- One (1) slim DVD-ROM drive [DVM-PNSC-824(B)]
- One (1) slim floppy drive [FPD-PNSC-S(B)]
- Three (3) sets of 4-cm counter-rotating fans (FAN-0086L)
- One (1) air shroud (MCP-310-00033-01)
- One (1) IDE cable (CBL-0139L)
- One (1) passive CPU heatsink (SNK-P0016)
- Riser Cards: (see Section 5-6 for details)
 - One (1) RSC-R1UU-E8R+ for PCI-E x4 card
 - One (1) CSE-R1UU-UE8 for PCI-E card (5015M-UR/5015M-U only)
 - One (1) CSE-R1UU-2E8 for two PCI-E cards (5015M-NTR/5015M-NT only)
- SATA Accessories
 - One (1) SATA backplane (BPN-SAS-815TQ)
 - One (1) SATA iPASS cable (CBL-0188L) (5015M-UR/5015M-U only)
 - Four (4) SAS drive carriers (MCP-220-00001-01)
 - One (1) SATA cable (CBL-0190L) (5015M-NTR/5015M-NT only)
 - One (1) SGPIO cable (CBL-0157) (5015M-NTR/5015M-NT only)
- One (1) rackmount kit (CSE-PT51L)
- One (1) CD containing drivers and utilities

- SuperServer 5015M-UR/5015M-U/5015M-NTR/5015M-NT User's Manual

Note: a "V" at the end of the server name indicates the chassis is silver, "B" indicates black.

1-2 Serverboard Features

At the heart of the SuperServer 5015M-UR/5015M-U/5015M-NTR/5015M-NT lies the PDSMU, a single processor serverboard based on Intel's 3010 chipset. Below are the main features of the PDSMU (see Figure 1-1 for a block diagram of the chipset).

Processors

The PDSMU supports a single 775-pin Intel® Xeon® 3000 Series, Pentium® D, Pentium Extreme Edition, Pentium 4, and Celeron D processors at a FSB speed of 1066/667/533 MHz. Please refer to the serverboard description pages on our web site for a complete listing of supported processors.

Memory

The PDSMU has four 240-pin DIMM sockets that can support up to 8 GB of unbuffered ECC/non-ECC DDR2-667/533/400 SDRAM. Memory may be installed in either interleaved or non-interleaved configurations. Please refer to Chapter 5 for details.

UIO (5015M-UR)

The PDSMU is a specially-designed serverboard that features Supermicro's UIO (Universal I/O) technology. UIO serverboards have a PCI-Express x8 connector that can support any one of several types of UIO card types to add SAS ports, additional LAN ports, etc. to the serverboard. This allows the user to tailor the serverboard to their own needs. **Note:** the 5015M-UR does not come with a UIO card installed.

Serial ATA

An on-chip (ICH7R) SATA controller is integrated into the PDSMU to provide a four-port, 3 Gb/sec Serial ATA subsystem, which is RAID 0, 1, 5 and 10 supported. The SATA drives are hot-swappable units. **Note:** The operating system you use

must have RAID support to enable the hot-swap capability and RAID function of the SATA drives.

Onboard Controllers/Ports

One floppy drive controller and one onboard ATA/100 controller are provided to support up to two IDE hard drives or ATAPI devices. The color-coded I/O ports include one COM port, a VGA (monitor) port, two USB 2.0 ports, PS/2 mouse and keyboard ports and two gigabit Ethernet ports.

ATI Graphics Controller

The PDSMU features an integrated ATI video controller based on the ES1000 graphics chip. The ES1000 was designed specifically for servers, featuring low power consumption, high reliability and superior longevity.

Other Features

Other onboard features that promote system health include onboard voltage monitors, a chassis intrusion header, auto-switching voltage regulators, chassis and CPU overheat sensors, virus protection and BIOS rescue.

1-3 Server Chassis Features

The SuperServer 5015M-UR/5015M-U/5015M-NTR/5015M-NT is a high-end, scalable server platform built upon the SC815TQ-R450U/SC815TQ-560U 1U server chassis. The following is a general outline of the main features of the SC815TQ-R450U/SC815TQ-560U chassis.

System Power

The SC815TQ-R450U (5015M-UR/5015M-NTR) features a redundant 450W power supply consisting of two power modules. The system does not need to be shut down when replacing or removing a single power supply module. The SC815TQ-560U (5015M-U/5015M-NT) features a single 560W power supply module. The system must be shut down when replacing or removing this power supply module.

SATA Subsystem

The SC815TQ-R450U/SC815TQ-560U chassis was designed to support four hot-swap SATA hard drives. **Note:** In the 5015M-NTR/5015M-NT, SATA drives are connected to the onboard SATA ports.

PCI Expansion Slots

5015M-UR/5015M-U: A riser card on the right side of the chassis supports one PCI-E x4 card. The left side supports a UIO card and one PCI-E x8 card.

5015M-NTR/5015M-NT: A riser card on the right side of the chassis supports one PCI-E x4 card. The left side supports two PCI-E x8 cards. See section 5-6 for details. (Right and left refer to the side when viewed from the front of the system. The 5015M-NTR/5015M-NT does not support a UIO card.)

Front Control Panel

The chassis' control panel provides you with system monitoring and control. LEDs indicate system power, HDD activity, network activity (two) and overheat/fan fail/power fail. A main power button and system reset button are also included.

I/O Backplane

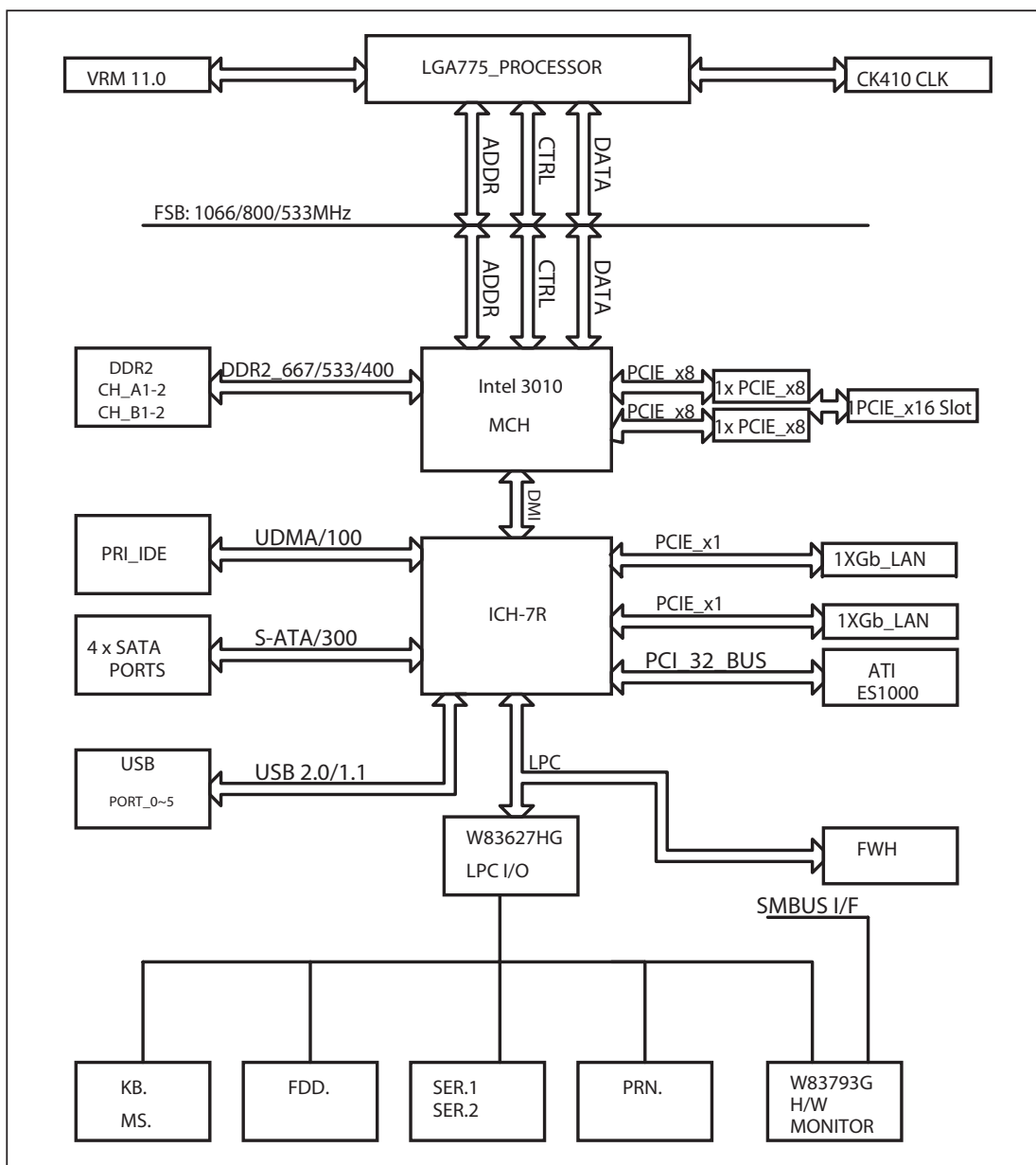
The SC815TQ-R450U/SC815TQ-560U is a 1U form factor chassis. Ports on the I/O backplane include one COM port, a VGA port, two USB 2.0 ports, PS/2 mouse and keyboard ports and two gigabit Ethernet ports. A UID (Unit Identifier) button and LED are also located beside the LAN2 Ethernet port.

Cooling System

The SC815TQ-R450U/SC815TQ-560U chassis has an innovative cooling design that features three sets of 4-cm counter-rotating fans located in the middle section of the chassis. There is a "Fan Speed Control Mode" setting in BIOS that allows chassis fan speed to be determined by system temperature. The power supply module also includes a cooling fan.

**Figure 1-1. Intel 3010 Chipset:
System Block Diagram**

Note: This is a general block diagram. Please see Chapter 5 for details.



1-4 Contacting Supermicro

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Technical Support:

Email: support@supermicro.com.tw

Tel: 886-2-8228-1366, ext.132 or 139

Chapter 2

Server Installation

2-1 Overview

This chapter provides a quick setup checklist to get your SuperServer 5015M-UR/5015M-U/5015M-NTR/5015M-NT up and running. Following these steps in the order given should enable you to have the system operational within a minimum amount of time. This quick setup assumes that your system has come to you with the processors and memory preinstalled. If your system is not already fully integrated with a serverboard, processors, system memory etc., please turn to the chapter or section noted in each step for details on installing specific components.

2-2 Unpacking the System

You should inspect the box the SuperServer 5015M-UR/5015M-U/5015M-NTR/5015M-NT was shipped in and note if it was damaged in any way. If the server itself shows damage you should file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the 5015M-UR/5015M-U/5015M-NTR/5015M-NT. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet. Be sure to read the Rack and Server Precautions in the next section.

2-3 Preparing for Setup

The box the SuperServer 5015M-UR/5015M-U/5015M-NTR/5015M-NT was shipped in should include two sets of rail assemblies, two rail mounting brackets and the mounting screws you will need to install the system into the rack. Follow the steps in the order given to complete the installation process in a minimum amount of time. Please read this section in its entirety before you begin the installation procedure outlined in the sections that follow.

Choosing a Setup Location

- Leave enough clearance in front of the rack to enable you to open the front door completely (~25 inches).
- Leave approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.
- This product is for installation only in a Restricted Access Location (dedicated equipment rooms, service closets and the like).
- This product is not suitable for use with visual display work place devices according to §2 of the the German Ordinance for Work with Visual Display Units.



Warnings and Precautions!



Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
- In single rack installation, stabilizers should be attached to the rack.
- In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a component from the rack.
- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.

Server Precautions

- Review the electrical and general safety precautions in Chapter 4.
- Determine the placement of each component in the rack *before* you install the rails.
- Install the heaviest server components on the bottom of the rack first, and then work up.
- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges, voltage spikes and to keep your system operating in case of a power failure.
- Allow the hot plug SATA drives and power supply modules to cool before touching them.
- Always keep the rack's front door and all panels and components on the servers closed when not servicing to maintain proper cooling.

Rack Mounting Considerations

Ambient Operating Temperature

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the ambient temperature of the room. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra).

Reduced Airflow

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

Mechanical Loading

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

Circuit Overloading

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Reliable Ground

A reliable ground must be maintained at all times. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (i.e. the use of power strips, etc.).

2-4 Installing the System into a Rack

This section provides information on installing the 5015M-UR/5015M-U/5015M-NTR/5015M-NT into a rack unit with the rack rails provided. If the system has already been mounted into a rack, you can skip ahead to Sections 2-5 and 2-6. There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly. You should also refer to the installation instructions that came with the rack unit you are using.

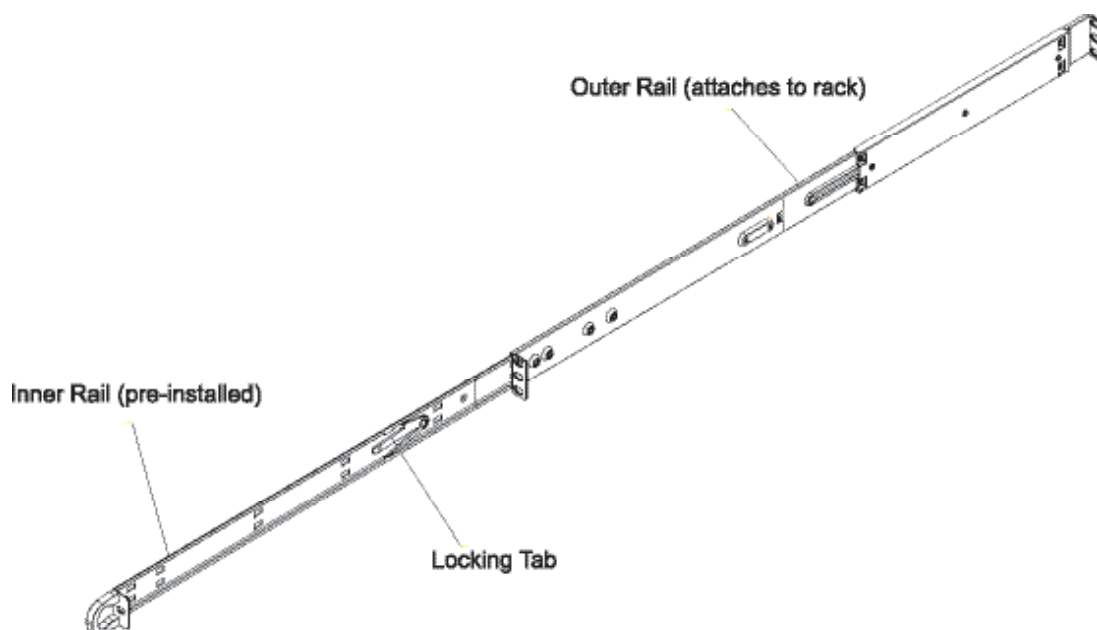
Identifying the Sections of the Rack Rails

You should have received two rack rail assemblies in the rack mounting kit. Each assembly consists of two sections: an inner fixed chassis rail that secures directly to the server chassis and an outer fixed rack rail that secures directly to the rack itself (see Figure 2-1). Two pairs of short brackets to be used on the front side of the outer rails are also included.

Installing the Inner Rails

Both the left and right side inner rails have been pre-attached to the chassis. Proceed to the next step.

**Figure 2-1. Identifying the Sections of the Rack Rails
(right side rail shown)**



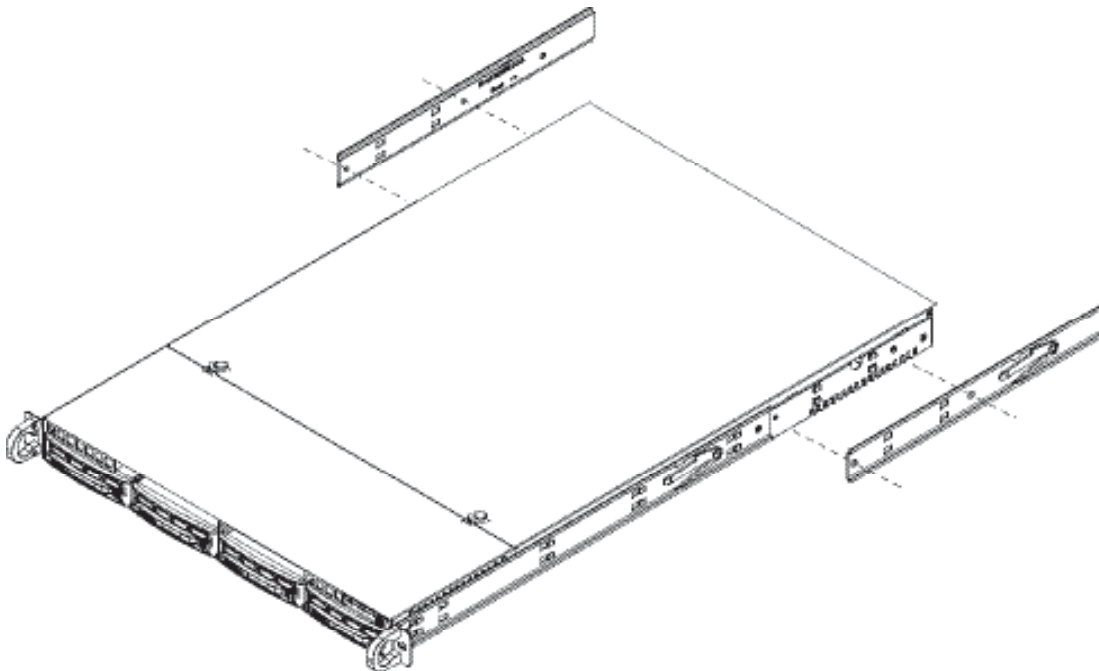
Installing the Outer Rails

Begin by measuring the distance from the front rail to the rear rail of the rack. Attach a short bracket to the front side of the right outer rail and a long bracket to the rear side of the right outer rail. Adjust both the short and long brackets to the proper distance so that the rail can fit snugly into the rack. Secure the short bracket to the front side of the outer rail with two screws and the long bracket to the rear side of the outer rail with three screws. Repeat these steps for the left outer rail.

Locking Tabs

Both chassis rails have a locking tab, which serves two functions. The first is to lock the server into place when installed and pushed fully into the rack, which is its normal position. Secondly, these tabs also lock the server in place when fully extended from the rack. This prevents the server from coming completely out of the rack when you pull it out for servicing.

Figure 2-2. Installing the Rack Rails

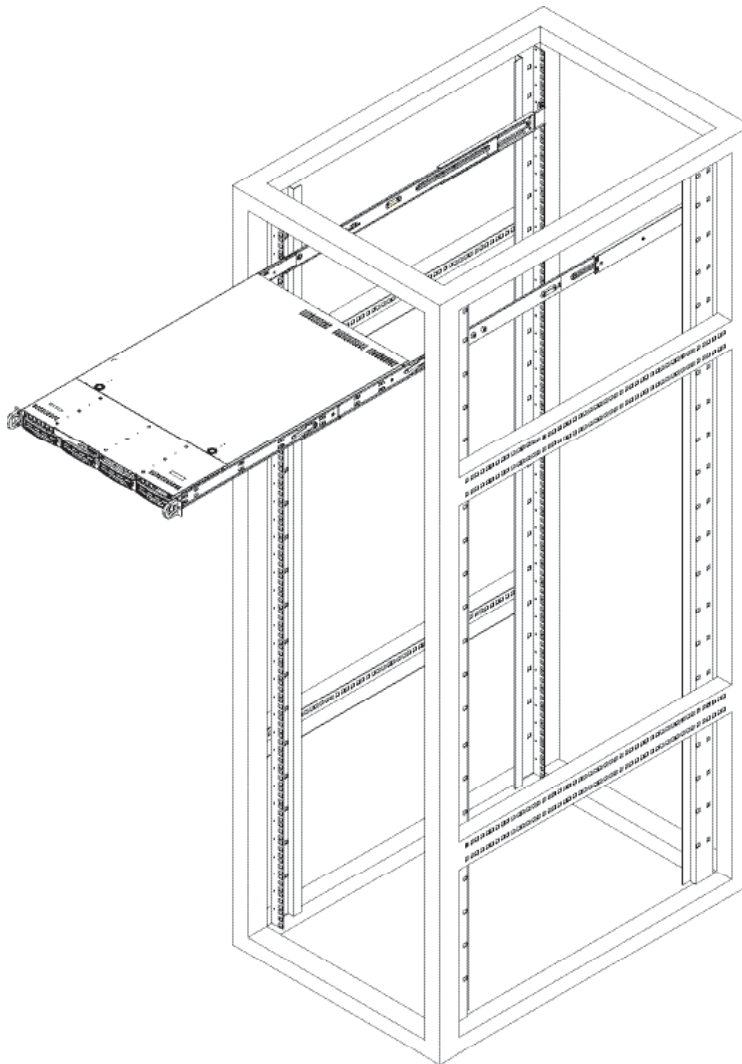


Installing the Server into the Rack

You should now have rails attached to both the chassis and the rack unit. The next step is to install the server into the rack. Do this by lining up the rear of the chassis rails with the front of the rack rails. Slide the chassis rails into the rack rails, keeping the pressure even on both sides (you may have to depress the locking tabs when inserting). See Figure 2-3.

When the server has been pushed completely into the rack, you should hear the locking tabs "click". Finish by inserting and tightening the thumbscrews that hold the front of the server to the rack.

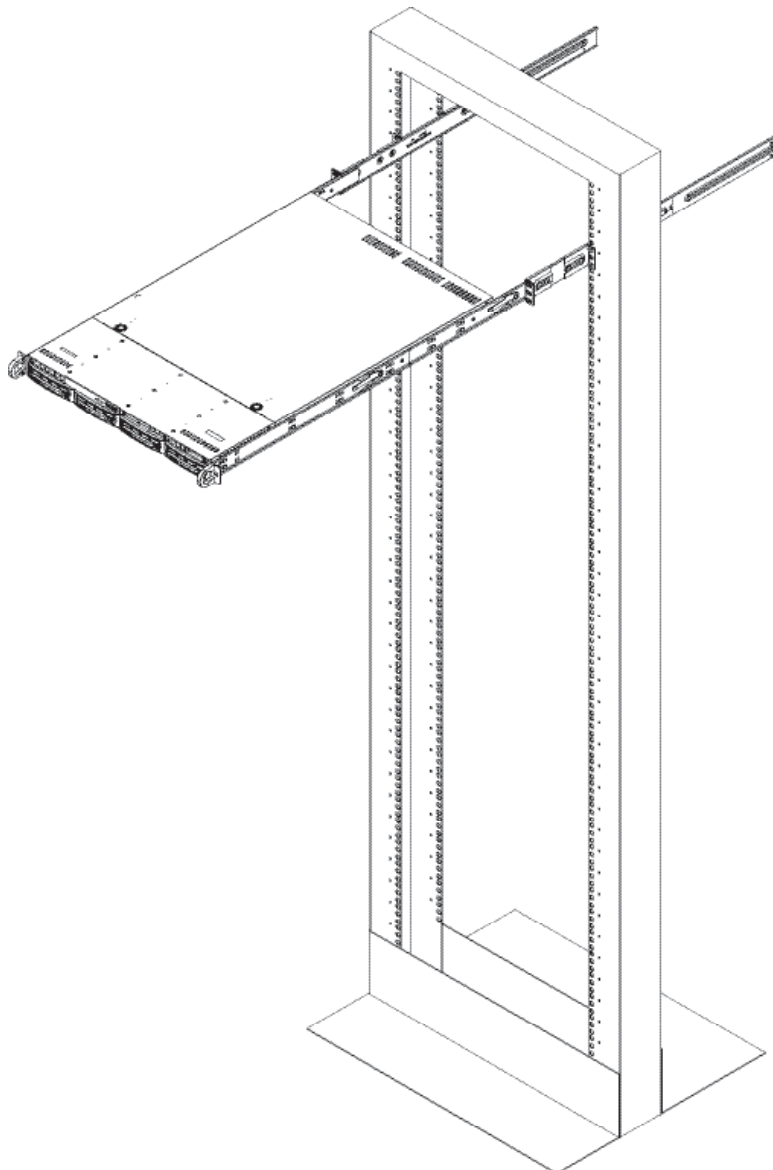
Figure 2-3. Installing the Server into a Rack



Installing the Server into a Telco Rack

To install the 5015M-UR/5015M-U/5015M-NTR/5015M-NT into a Telco type rack, use two L-shaped brackets on either side of the chassis (four total). First, determine how far follow the server will extend out the front of the rack. Larger chassis should be positioned to balance the weight between front and back. If a bezel is included on your server, remove it. Then attach the two front brackets to each side of the chassis, then the two rear brackets positioned with just enough space to accommodate the width of the telco rack. Finish by sliding the chassis into the rack and tightening the brackets to the rack.

Figure 2-4. Installing the Server into a Telco Rack



2-5 Checking the Serverboard Setup

After you install the 5015M-UR/5015M-U/5015M-NTR/5015M-NT in the rack, you will need to open the top cover to make sure the serverboard is properly installed and all the connections have been made.

1. Accessing the inside of the system (see Figure 2-5)

First, grasp the two handles on either side and pull the system straight out until it locks (you will hear a "click"). Next, depress the two buttons on the top of the chassis to release the top cover (1). Push the cover away from you (toward the rear of the chassis) until it stops (2). You can then lift the top cover from the chassis to gain full access to the inside of the server.

To remove the system from the rack completely, depress the locking tabs in the chassis rails (push the right-side tab down and the left-side tab up) to continue to pull the system out past the locked position.

2. Check the CPUs (processors)

You may have one or two processors already installed in the serverboard. Each processor needs its own heatsink. See Chapter 5 for instructions on processor and heatsink installation.

3. Check the system memory

Your server system may have come with system memory already installed. Make sure all DIMMs are fully seated in their slots. For details on adding system memory, refer to Chapter 5.

4. Installing add-on cards

If desired, you can install add-on cards to the system. See Chapter 5 for details on installing PCI add-on cards.

5. Check all cable connections and airflow

Make sure all power and data cables are properly connected and not blocking the chassis airflow. See Chapter 5 for details on cable connections.

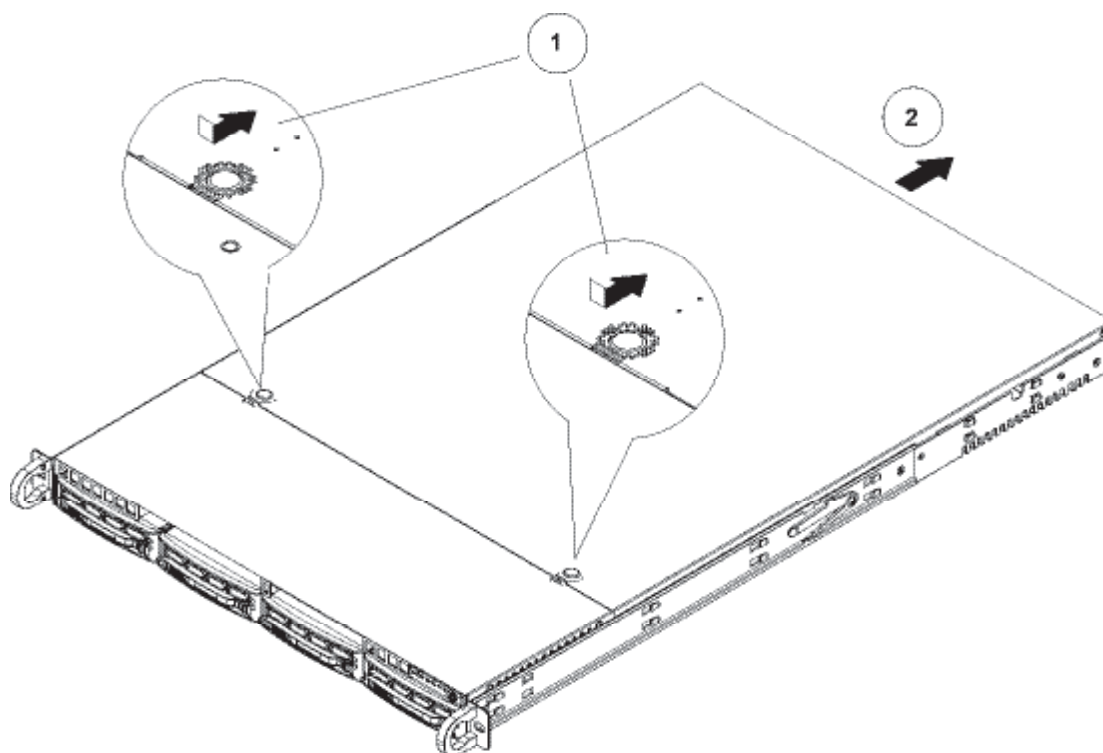


Figure 2-5. Accessing the Inside of the System

2-6 Checking the Drive Bay Setup

Next, you should check to make sure the peripheral drives and the SATA drives and SATA backplane have been properly installed and all connections have been made.

1. Accessing the drive bays

All drives are accessible from the front of the server. For servicing the DVD-ROM and floppy drives, you will need to remove the top chassis cover. The SATA disk drives can be installed and removed from the front of the chassis without removing the top chassis cover.

2. DVD-ROM and floppy disk drives

A slim DVD-ROM and floppy drive should be preinstalled in your server. Refer to Chapter 6 if you need to reinstall a DVD-ROM and/or floppy disk drive to the system.

3. Check the SATA disk drives

Depending upon your system's configuration, your system may have one or more drives already installed. If you need to install SATA drives, please refer to Chapter 6.

4. Check the airflow

Airflow is provided by three sets of 4-cm fans (each set of fans consists of two fans that are mounted back to back). The system component layout was carefully designed to direct sufficient cooling airflow to the components that generate the most heat. Note that all power and data cables have been routed in such a way that they do not block the airflow generated by the fans.

5. Supplying power to the system

The last thing you must do is to provide input power to the system. Plug the power cords from the power supply modules into a high-quality power strip that offers protection from electrical noise and power surges. It is recommended that you use an uninterruptible power supply (UPS) source.

Chapter 3

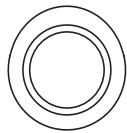
System Interface

3-1 Overview

There are several LEDs on the control panel as well as others on the SATA drive carriers to keep you constantly informed of the overall status of the system as well as the activity and health of specific components. There are also two buttons on the chassis control panel and an on/off switch on the power supply. This chapter explains the meanings of all LED indicators and the appropriate response you may need to take.

3-2 Control Panel Buttons

There are three push-buttons located on the front of the chassis: a reset button, a UID button and a power on/off button.



- **UID:** Depressing the UID (unit identifier) button illuminates an LED on both the front and rear of the chassis for easy system location in large stack configurations. The LED will remain on until the button is pushed a second time. Another UID button on the rear of the chassis serves the same function.

RESET



- **Reset:** Use the reset button to reboot the system.



- **Power:** The main power button is used to apply or remove power from the power supply to the server system. Turning off system power with this button removes the main power but keeps standby power supplied to the system.

3-3 Control Panel LEDs

The control panel located on the front of th SC815TQ-R450U/SC815TQ-560U chassis has five LEDs. These LEDs provide you with critical information related to different parts of the system. This section explains what each LED indicates when illuminated and any corrective action you may need to take.



- **Universal Information LED:** When this LED blinks red quickly, it indicates a fan failure and when blinking red slowly a power failure. This LED will be blue when used for UID (Unit Identifier). When on continuously it indicates an overheat condition, which may be caused by cables obstructing the airflow in the system or the ambient room temperature being too warm. Check the routing of the cables and make sure all fans are present and operating normally. You should also check to make sure that the chassis covers are installed. Finally, verify that the heatsinks are installed properly (see Chapter 5). This LED will remain flashing or on as long as the indicated condition exists. See the table below for descriptions of the LED states.

Figure 3-1. Universal Information LED States

| Universal Information LED States | |
|----------------------------------|----------------------------|
| State | Indication |
| Fast Blinking Red (1x/sec) | Fan Fail |
| Solid Red | CPU Overheat |
| Slow Blinking Red (1x/4 sec) | Power Fail |
| Solid Blue | Local UID Button Depressed |
| Blinking Blue | IPMI-Activated UID |

Note: deactivating the UID LED must be performed in the same way it was activated. (If the UID LED was activated via IPMI, you can only turn the LED off via IPMI and not with the UID button.)



- **NIC2:** Indicates network activity on LAN2 when flashing .



- **NIC1:** Indicates network activity on LAN1 when flashing.



- **HDD:** Indicates IDE channel activity. On the SuperServer 5015M-UR/ 5015M-U/5015M-NTR/5015M-NT this light indicates SATA and/or DVD-ROM drive activity when flashing.



- **Power:** Indicates power is being supplied to the system's power supply units. This LED should normally be illuminated when the system is operating.

3-4 SATA Drive Carrier LEDs

Each Serial ATA drive carrier has two LEDs.

- **Green:** When illuminated, the green LED on the front of the SATA drive carrier indicates drive activity. A connection to the SATA backplane enables this LED to blink on and off when that particular drive is being accessed.
- **Red:** The red LED indicates two states. When blinking, it indicates the drive is rebuilding. When solid, it indicates a drive failure. If a SATA drive fails, you should be notified by your system management software. Please refer to Chapter 6 for instructions on replacing failed SATA drives.

Notes

Chapter 4

System Safety

4-1 Electrical Safety Precautions



Basic electrical safety precautions should be followed to protect yourself from harm and the system from damage:

- Be aware of the locations of the power on/off switch on the chassis as well as the room's emergency power-off switch, disconnection switch or electrical outlet. If an electrical accident occurs, you can then quickly remove power from the system.
- Do not work alone when working with high voltage components.
- Power should always be disconnected from the system when removing or installing main system components, such as the serverboard, memory modules and the DVD-ROM and floppy drives (not necessary for SATA drives). When disconnecting power, you should first power down the system with the operating system and then unplug the power cords from all the power supply modules in the system.
- When working around exposed electrical circuits, another person who is familiar with the power-off controls should be nearby to switch off the power if necessary.
- Use only one hand when working with powered-on electrical equipment. This is to avoid making a complete circuit, which will cause electrical shock. Use extreme caution when using metal tools, which can easily damage any electrical components or circuit boards they come into contact with.
- Do not use mats designed to decrease electrostatic discharge as protection from electrical shock. Instead, use rubber mats that have been specifically designed as electrical insulators.
- The power supply power cord must include a grounding plug and must be plugged into grounded electrical outlets.

- Serverboard Battery: **CAUTION** - There is a danger of explosion if the onboard battery is installed upside down, which will reverse its polarities (see Figure 4-1). This battery must be replaced only with the same or an equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.
- DVD-ROM Laser: **CAUTION** - this server may have come equipped with a DVD-ROM drive. To prevent direct exposure to the laser beam and hazardous radiation exposure, do not open the enclosure or use the unit in any unconventional way.
- Mainboard replaceable soldered-in fuses: Self-resetting PTC (Positive Temperature Coefficient) fuses on the mainboard must be replaced by trained service technicians only. The new fuse must be the same or equivalent as the one replaced. Contact technical support for details and support.

4-2 General Safety Precautions



Follow these rules to ensure general safety:

- Keep the area around the SuperServer 5015M-UR/5015M-U/5015M-NTR/5015M-NT clean and free of clutter.
- The SuperServer 5015M-UR/5015M-U/5015M-NTR/5015M-NT weighs approximately 45/42 lbs. (20.5/19.1 kg.) when fully loaded. When lifting the system, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.
- Place the chassis top cover and any system components that have been removed away from the system or on a table so that they won't accidentally be stepped on.
- While working on the system, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, which can come into contact with electrical circuits or be pulled into a cooling fan.
- Remove any jewelry or metal objects from your body, which are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.

- After accessing the inside of the system, close the system back up and secure it to the rack unit with the retention screws after ensuring that all connections have been made.

4-3 ESD Precautions



Electrostatic discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards. The following measures are generally sufficient to neutralize this difference before contact is made to protect your equipment from ESD:

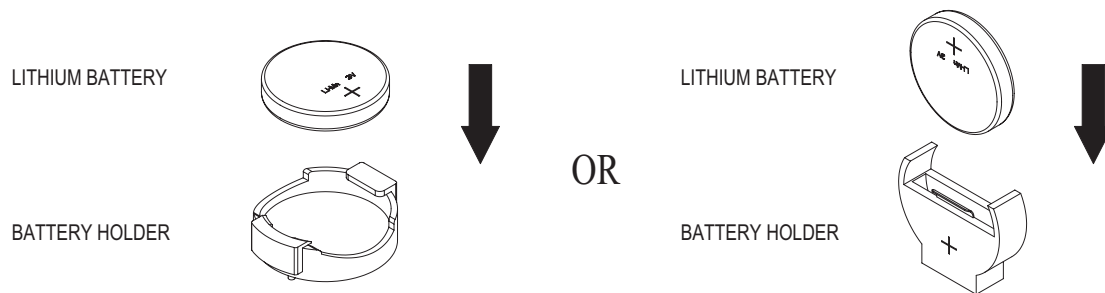
- Use a grounded wrist strap designed to prevent static discharge.
- Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Do not let components or PCBs come into contact with your clothing, which may retain a charge even if you are wearing a wrist strap.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

4-4 Operating Precautions



Care must be taken to assure that the chassis cover is in place when the 5015M-UR/5015M-U/5015M-NTR/5015M-NT is operating to ensure proper cooling. Out of warranty damage to the 5015M-UR/5015M-U/5015M-NTR/5015M-NT system can occur if this practice is not strictly followed.

Figure 4-1. Installing the Onboard Battery



Chapter 5

Advanced Serverboard Setup

This chapter covers the steps required to install processors and heatsinks to the PDSMU serverboard, connect the data and power cables and install add-on cards. All serverboard jumpers and connections are described and a layout and quick reference chart are included in this chapter. Remember to close the chassis completely when you have finished working on the serverboard to protect and cool the system sufficiently.

5-1 Handling the Serverboard

Static electrical discharge can damage electronic components. To prevent damage to printed circuit boards, it is important to handle them very carefully (see Chapter 4). Also note that the size and weight of the serverboard can cause it to bend if handled improperly, which may result in damage. To prevent the serverboard from bending, keep one hand under the center of the board to support it when handling. The following measures are generally sufficient to protect your equipment from static discharge.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.

Unpacking

The serverboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

5-2 Processor and Heatsink Installation



When handling the processor, avoid placing direct pressure on the label area of the fan. Also, do not place the serverboard on a conductive surface, which can damage the BIOS battery and prevent the system from booting up.

IMPORTANT! Always connect the power cord last and remove it first before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket *before* you install the heatsink and fan. If installing one processor only, install it into CPU socket #1.

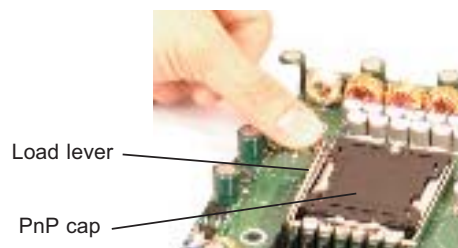
Notes:

Intel's boxed CPU package contains a CPU fan and heatsink assembly. If you buy a CPU separately, make sure that you use only Intel-certified multi-directional heatsinks and fans.

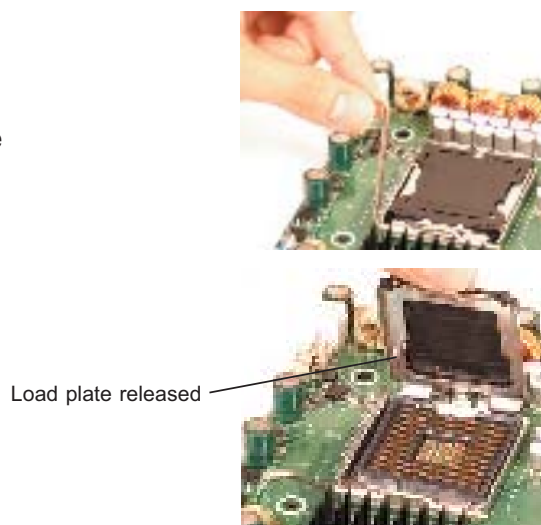
When purchasing an LGA 775 CPU or when receiving a serverboard with one pre-installed, make sure that the CPU plastic cap is in place and none of the CPU pins are bent; otherwise, contact the retailer immediately.

Installing the Processor

1. A black PnP cap is attached to the load plate to protect the CPU socket. Press the load lever down and away from the retention clasp to release the load plate from its locked position.



2. Gently lift the load lever to open the load plate.



3. Use your thumb and your index finger to hold the CPU at opposite sides.

4. Align pin1 of the CPU (the corner marked with a triangle) with the notched corner of the CPU socket.

5. Find the corner of the CPU that has a semi-circle cutout below a gold dot (CPU key). This corner should be aligned with the cutout on the socket (socket key).

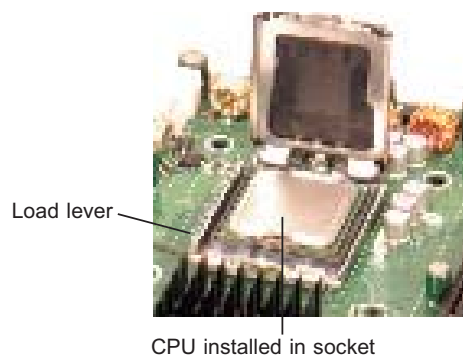
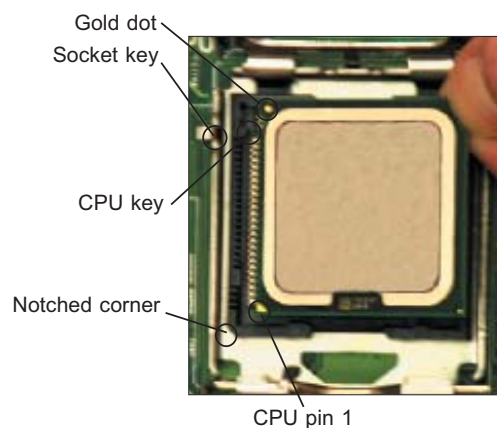
6. Once aligned, carefully lower the CPU straight down into the socket. Do not drop the CPU on the socket, do not move the CPU horizontally or vertically and do not rub the CPU against any surface or any of the contacts, which may damage the CPU and/or contacts.

7. With the CPU in the socket, inspect the four corners of the CPU to make sure that it is properly installed.

8. Use your thumb to gently push the load lever down until it snaps into the retention clasp.

9. If the CPU is properly installed into the socket, the PnP cap will be automatically released from the load plate when the lever locks. Remove the cap. Repeat steps to install a second CPU if desired.

Warning! Keep the plastic PnP cap. The serverboard must be shipped with the PnP cap properly installed to protect the CPU socket. Shipment without the PnP cap properly installed will void the warranty.



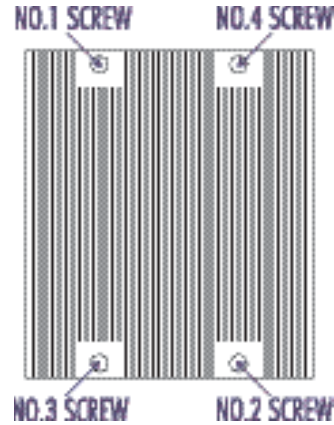
Installing the Heatsink

1. Do not apply any thermal grease to the heatsink or the CPU die; the required amount has already been applied.

2. Place the heatsink on top of the CPU so that the four mounting holes are aligned with those on the (preinstalled) heatsink retention mechanism.

3. Screw in two diagonal screws (i.e. the #1 and the #2 screws) until just snug. Do not fully tighten the screws or you may damage the CPU.)

4. Add the two remaining screws then finish the installation by fully tightening all four screws.



Removing the Heatsink



Warning! We do not recommend that the CPU or the heatsink be removed. However, if you do need to uninstall the heatsink, please follow the instructions below to prevent damage to the CPU or the CPU socket.

1. Unscrew and remove the heatsink screws from the serverboard in the sequence as show in the picture above.

2. Hold the heatsink and gently wriggle the heatsink to loosen it from the CPU. (Do not use excessive force when wriggling the heatsink!!)

3. Once the heatsink is loose, remove it from the CPU.

4. Clean the surface of the CPU and the heatsink to get rid of the old thermal grease. Reapply the proper amount of thermal grease on the surface before you re-install the heatsink.

5-3 Connecting Cables

Now that the processors are installed, the next step is to connect the cables to the serverboard. These include the data (ribbon) cables for the peripherals and control panel and the power cables.

Connecting Data Cables

The ribbon cables used to transfer data from the peripheral devices have been carefully routed in preconfigured systems to prevent them from blocking the flow of cooling air that moves through the system from front to back. If you need to disconnect any of these cables, you should take care to reroute them as they were originally after reconnecting them (make sure the red wires connect to the pin 1 locations). If you are configuring the system, keep the airflow in mind when routing the cables. The following data cables (with their serverboard connector locations noted) should be connected. See the serverboard layout diagram in this chapter for connector locations.

- DVD-ROM Drive cable (IDE#1)
- Control Panel cable (JF1, see next page)
- SATA cables, 5015M-NTR/5015M-NT only (SATA0 ~ SATA3)
- SGPIO cable, 5015M-NTR/5015M-NT only (SGPIO1 to SATA back-plane)

Connecting Power Cables

The PDSMU has a 20-pin primary power supply connector designated "JPW1" for connection to the ATX power supply. Connect the appropriate connector from the power supply to JPW1 to supply power to the serverboard. See the Connector Definitions section in this chapter for power connector pin definitions.

In addition, your power supply must be connected to the 8-pin Processor Power connector at JPW2.

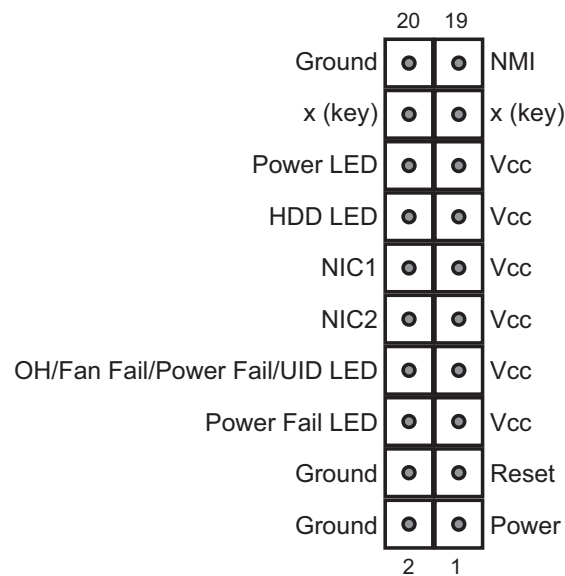
Connecting the Control Panel

JF1 contains header pins for various front control panel connectors. See Figure 5-1 for the pin locations of the various front control panel buttons and LED indicators. Please note that even and odd numbered pins are on opposite sides of each header.

All JF1 wires have been bundled into single keyed ribbon cable to simplify their connection. The red wire in the ribbon cable plugs into pin 1 of JF1. Connect the other end of the cable to the Control Panel printed circuit board, located just behind the system status LEDs in the chassis.

See the Connector Definitions section in this chapter for details and pin descriptions of JF1.

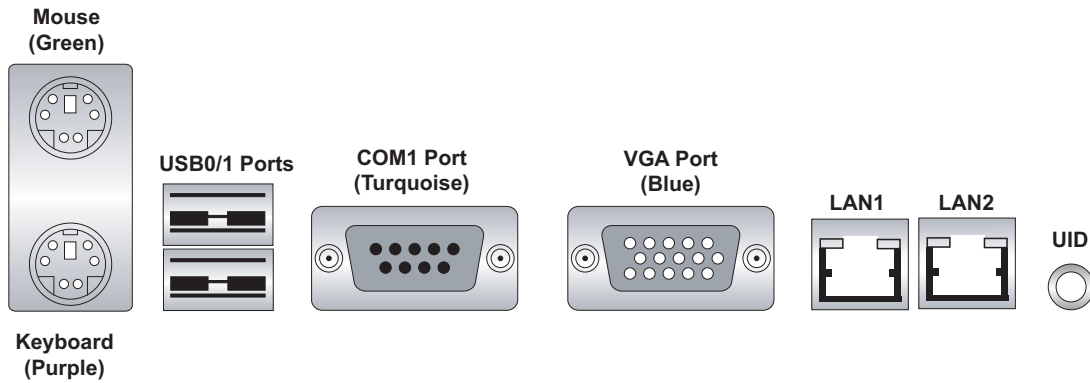
Figure 5-1. Front Control Panel Header Pins (JF1)



5-4 I/O Ports

The I/O ports are color coded in conformance with the PC 99 specification. See Figure 5-2 below for the colors and locations of the various I/O ports.

Figure 5-2. Rear Panel I/O Ports



5-5 Installing Memory

Note: Check the Supermicro web site for recommended memory modules.

CAUTION

Exercise extreme care when installing or removing DIMM modules to prevent any possible damage. Also note that memory may be interleaved to improve performance (see step 1).

DIMM Installation

1. Insert the desired number of DIMMs into the memory slots, starting with slots DIMM1A and DIMM2A (the blue slots). Both interleaved and non-interleaved memory are supported, so you may populate any number of DIMM slots. Populating two slots at a time (DIMM1A + DIMM2A, DIMM1B + DIMM2B, etc.) with memory modules of the same size and of the same type will result in dual-channel, interleaved memory which is faster than the single-channel, non-interleaved memory.
2. Insert each DIMM module vertically into its slot. Pay attention to the notch along the bottom of the module to prevent inserting the DIMM module incorrectly.
3. Gently press down on the DIMM module until it snaps into place in the slot. Repeat for all modules (see step 1 above).

Memory Support

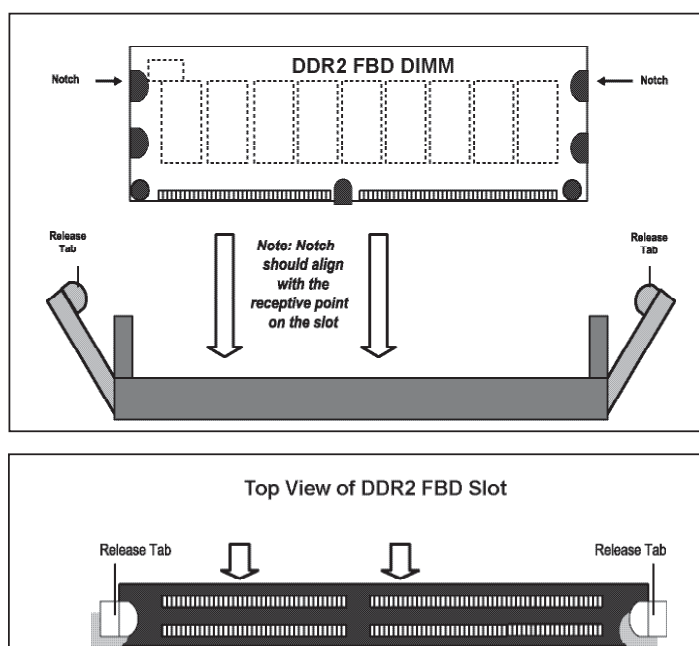
The PDSMU supports up to 8 GB of unbuffered ECC/non-ECC DDR2-667/533/400 SDRAM. Interleaved memory requires modules of the same size and speed to be installed in pairs. Do not mix DIMMs of different sizes and speeds. **Notes:** Due to OS limitations, some operating systems may not show more than 4 GB of memory. Due to memory allocation to system devices, memory remaining available for operational use will be reduced when 4 GB of RAM is used. The reduction in memory availability is disproportional. (Refer to the table below for details.)

| Possible System Memory Allocation & Availability | | |
|---|--------|---|
| System Device | Size | Physical Memory Remaining (4 GB Total System Memory) |
| Firmware Hub flash memory (System BIOS) | 1 MB | 3.99 |
| Local APIC | 4 KB | 3.99 |
| Area Reserved for the chipset | 2 MB | 3.99 |
| I/O APIC (4 Kbytes) | 4 KB | 3.99 |
| PCI Enumeration Area 1 | 256 MB | 3.76 |
| PCI Express (256 MB) | 256 MB | 3.51 |
| PCI Enumeration Area 2 (if needed) -Aligned on 256-MB boundary- | 512 MB | 3.01 |
| VGA Memory | 16 MB | 2.85 |
| TSEG | 1 MB | 2.84 |
| Memory available to System BIOS & OS applications | | 2.84 |

Figure 5-3. Installing DIMM into Slot

To Install: Insert module vertically and press down until it snaps into place. Pay attention to the bottom notch.

To Remove: Use your thumbs to gently push each release tab outward to free the DIMM from the slot.



5-6 Adding PCI Cards

1. PCI Expansion Slots

Two riser cards are used to support add-on cards to the system. The SC815TQ-R450U/SC815TQ-560U chassis can accommodate one standard size (full height full length) and one low profile PCI expansion card. When viewed from the chassis front, the standard size card installs to the left and the low-profile card installs to the right side.

PCI cards are installed into riser cards that have been pre-installed to the system. An additional two riser cards are included to support PCI-E add-on cards. See configuration list below.

2. PCI card installation

Before installing a PCI add-on card, make sure you install it into the correct riser card. Begin by releasing the locking tab that corresponds to the slot you wish to populate. Insert the expansion card into the correct riser card, pushing down with your thumbs evenly on both sides of the card.

PCI Slot/Card Configurations

5015M-UR/5015M-NTR

Left Side Riser Card

CSE-R1UU-UE8 (preinstalled)

Expansion card supported

1x UIO card and 1x PCI-E x8 card

Right Side Riser Card

RSC-R1UU-E8R+

Expansion card supported

1x PCI-Express x4 card

5015M-U/5015M-NT

Left Side Riser Card

CSE-R1UU-2E8 (preinstalled)

Expansion card supported

2x PCI-E x8 cards

Right Side Riser Card

RSC-R1UU-E8R+

Expansion card supported

1x PCI-Express x4 card

PDSMU Quick Reference

| Jumper | Description | Default Setting |
|---------------|-------------------------|------------------------|
| JAR | Alarm Reset Enable | Open (Disabled) |
| JBT1 | CMOS Clear | See Section 5-9 |
| JPF | Power Force-On | Open (Disabled) |
| JPG1 | VGA Enable | Pins 1-2 (Enabled) |
| JPL1/JPL2 | Giga-bit LAN 1/2 Enable | Pins 1-2 (Enabled) |
| JWD | Watch Dog Enable | Pins 1-2 (Reset) |

| Connector | Description |
|------------------|--|
| COM1/COM2 | COM1 (Port)/COM 2 (Header) |
| Fans 1-6 | Fan Headers |
| Floppy | Floppy Disk Connector |
| IDE#1 | IDE Connector |
| J9 | Speaker Header |
| JF1 | Front Control Panel Header |
| JL1 | Chassis Intrusion Header |
| JLED | Power LED Header |
| JPW1 | 24-Pin ATX Power Connector |
| JPW2 | 8-pin Power Connector (Required) |
| JWOR | Wake On Ring header |
| LAN1/LAN2 | Ethernet RJ45 (Gigabit LAN) Ports |
| PW3 | Power Supply Fail Connector |
| PW4 | Power System Management Bus (I ² C) |
| SATA 0-3 | Serial ATA Ports |
| SEPC | Proprietary Power Connector (for UIO) |
| SIMSO | SIMSO IPMI Slot |
| UID | Unit Identifier Button |
| USB0/1 | Universal Serial Bus Ports |
| USB2/3,USB4/5 | Universal Serial Bus Headers |
| WOL | Wake On LAN header |

| LEDs | Description |
|-------------|---------------------------|
| LE1 | UID LED Indicator* |
| PWR-LED | Power Ready LED Indicator |

*LE1: When this blue LED is on, either the control panel UID button or the back panel UID button has been pressed by the user to indicate the location of the unit.

5-8 Connector Definitions

ATX Power Connector

The primary ATX power supply connector meets the SSI (Superset ATX) 24-pin specification. Make sure that the orientation of the connector is correct. See the table on the right for pin definitions.

| ATX Power 24-pin Connector Pin Definitions (JPW1) | | | |
|--|------------|-------|------------|
| Pin# | Definition | Pin # | Definition |
| 13 | +3.3V | 1 | +3.3V |
| 14 | -12V | 2 | +3.3V |
| 15 | COM | 3 | COM |
| 16 | PS_ON | 4 | +5V |
| 17 | COM | 5 | COM |
| 18 | COM | 6 | +5V |
| 19 | COM | 7 | COM |
| 20 | Res (NC) | 8 | PWR_OK |
| 21 | +5V | 9 | 5VSB |
| 22 | +5V | 10 | +12V |
| 23 | +5V | 11 | +12V |
| 24 | COM | 12 | +3.3V |

Processor Power Connector

JPW2 must also be connected to the power supply to provide power for the processor(s). See the table on the right for pin definitions.

| Processor Power Pin Definitions (JPW2) | |
|---|------------|
| Pins | Definition |
| 1 through 4 | Ground |
| 5 through 8 | +12V |

NMI Button

The non-maskable interrupt button header is located on pins 19 and 20 of JF1. Refer to the table on the right for pin definitions.

| NMI Button Pin Definitions (JF1) | |
|-------------------------------------|------------|
| Pin# | Definition |
| 19 | Control |
| 20 | Ground |

Power LED

The Power LED connection is located on pins 15 and 16 of JF1. Refer to the table on the right for pin definitions.

| Power LED Pin Definitions (JF1) | |
|------------------------------------|------------|
| Pin# | Definition |
| 15 | Vcc |
| 16 | Control |

HDD LED

The HDD (IDE Hard Disk Drive) LED connection is located on pins 13 and 14 of JF1. Attach the IDE hard drive LED cable to display disk activity. Refer to the table on the right for pin definitions.

| HDD LED Pin Definitions (JF1) | |
|----------------------------------|------------|
| Pin# | Definition |
| 13 | Vcc |
| 14 | HD Active |

NIC1 LED

The NIC1 (Network Interface Controller) LED connection is located on pins 11 and 12 of JF1. Attach the NIC1 LED cable to display network activity. Refer to the table on the right for pin definitions.

| NIC1 LED Pin Definitions (JF1) | |
|-----------------------------------|------------|
| Pin# | Definition |
| 11 | Vcc |
| 12 | Ground |

NIC2 LED

The NIC2 (Network Interface Controller) LED connection is located on pins 9 and 10 of JF1. Attach the NIC2 LED cable to display network activity. Refer to the table on the right for pin definitions.

| NIC2 LED Pin Definitions (JF1) | |
|-----------------------------------|------------|
| Pin# | Definition |
| 9 | Vcc |
| 10 | Ground |

Universal Information LED

Connect an LED to pins 7 and 8 of JF1 to provide advanced warning of chassis overheating or fan failure. These pins also work with the front UID indicator, which will activate as either a solid or flashing blue LED depending on whether the LED was activated via IPMI or the UID button. Refer to the tables on the right for pin definitions and status indicators.

| Universal Info. LED Pin Definitions (JF1) | |
|--|------------|
| Pin# | Definition |
| 7 | Vcc |
| 8 | Control |

| Red LED Indications | |
|----------------------|------------------|
| State | Indication |
| Solid | Overheat |
| Blinking (fast) | Fan Fail |
| Blinking (slow) | Power Fail |
| Blue LED Indications | |
| State | Indication |
| Solid | UID (via Button) |
| Blinking | UID (via IPMI) |

Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1. Refer to the table on the right for pin definitions.

| Power Fail LED Pin Definitions (JF1) | |
|---|------------|
| Pin# | Definition |
| 5 | Vcc |
| 6 | Ground |

Reset Button

The Reset Button connection is located on pins 3 and 4 of JF1. Attach it to the hardware reset switch on the computer case. Refer to the table on the right for pin definitions.

| Reset Button Pin Definitions (JF1) | |
|---------------------------------------|------------|
| Pin# | Definition |
| 3 | Reset |
| 4 | Ground |

Power Button

The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (see the Power Button Mode setting in BIOS). To turn off the power when set to suspend mode, depress the button for at least 4 seconds. Refer to the table on the right for pin definitions.

| Power Button Pin Definitions (JF1) | |
|---------------------------------------|------------|
| Pin# | Definition |
| 1 | PW_ON |
| 2 | Ground |

Universal Serial Bus (USB0/1)

Two Universal Serial Bus ports are located on the I/O backplane. USB0 is the bottom connector and USB1 is the top connector. See the table on the right for pin definitions.

| Universal Serial Bus Pin Definitions (USB0/1) | | | |
|--|------------|-------|------------|
| USB0 | | USB1 | |
| Pin # | Definition | Pin # | Definition |
| 1 | +5V | 1 | +5V |
| 2 | PO- | 2 | PO- |
| 3 | PO+ | 3 | PO+ |
| 4 | Ground | 4 | Ground |
| 5 | N/A | 5 | Key |

Universal Serial Bus Headers

Four additional USB headers (USB2/3 and USB4/5) are included on the serverboard. These may be used for front side access. A USB cable (not included) is needed for the connection. See the table on the right for pin definitions.

| Universal Serial Bus Headers Pin Definitions (USB2/3, USB4/5) | | | |
|--|------------|------------|------------|
| USB2 | | USB3, USB4 | |
| Pin # | Definition | Pin # | Definition |
| 1 | +5V | 1 | +5V |
| 2 | PO- | 2 | PO- |
| 3 | PO+ | 3 | PO+ |
| 4 | Ground | 4 | Ground |
| 5 | Key | 5 | NC |

Serial Ports

The COM1 serial port is located on the IO backplane. COM2 is a header on the serverboard (see serverboard layout for location). See the table on the right for pin definitions.

| Serial Port Pin Definitions (COM1, COM2) | | | |
|---|------------|-------|------------|
| Pin # | Definition | Pin # | Definition |
| 1 | DCD | 6 | DSR |
| 2 | RXD | 7 | RTS |
| 3 | TXD | 8 | CTS |
| 4 | DTR | 9 | RI |
| 5 | Ground | 10 | NC |

Note: Pin 10 is included on the header but not on the port. NC indicates no connection.

Fan Headers

The PDSMU has six fan headers, designated Fan1 through Fan6. All are 4-pin fans to provide a Pulse Width Modulated (PWM) signal, however pins 1-3 of the headers are backward compatible with traditional 3-pin fans. Connect the CPU heatsink fan and the system (chassis) fans to these headers. Their speed is controlled via Thermal Management with a BIOS setting. See the tables on the right for pin definitions.

| Fan Header Pin Definitions (FAN1-6) | |
|---|----------------|
| Pin# | Definition |
| 1 | Ground (Black) |
| 2 | +12V (Red) |
| 3 | Tachometer |
| 4 | PWM Control |

Note: When using Thermal Management settings, please use all 3-pin fans or all 4-pin fans. Please do not use both 3-pin fans and 4-pin fans together.

Chassis Intrusion

A Chassis Intrusion header is located at JL1. Attach the appropriate cable to inform you of a chassis intrusion.

| Chassis Intrusion Pin Definitions (JL1) | |
|--|-----------------|
| Pin# | Definition |
| 1 | Intrusion Input |
| 2 | Ground |

Speaker Connector

The speaker connector located at J9 allows you to choose between using the internal or an external speaker. For the internal speaker, jump pins 3 and 4. To use an external speaker, place the speaker cable header on all four pins. See the table on the right.

| Speaker Connector Pin Definitions (J9) | |
|---|------------------|
| Pin Setting | Definition |
| Pins 3-4 | Internal Speaker |
| Pins 1-4 | External Speaker |

ATX PS/2 Keyboard and PS/2 Mouse Ports

The ATX PS/2 keyboard and the PS/2 mouse ports are located beside the USB ports. See the table on the right for pin definitions.

| PS/2 Keyboard and Mouse Ports Pin Definitions | |
|---|------------|
| Pin# | Definition |
| 1 | Data |
| 2 | NC |
| 3 | Ground |
| 4 | VCC |
| 5 | Clock |
| 6 | NC |

Wake-On-LAN

The Wake-On-LAN header is designated WOL. See the table on the right for pin definitions. You must enable the LAN Wake-Up setting in BIOS to use this feature. You must also have a LAN card with a Wake-on-LAN connector and cable.

| Wake-On-LAN Pin Definitions (WOL) | |
|--------------------------------------|-------------|
| Pin# | Definition |
| 1 | +5V Standby |
| 2 | Ground |
| 3 | Wake-up |

Wake-On-Ring

The Wake-On-Ring header is designated JWOR. This function allows your computer to receive and "wake-up" by an incoming call to the modem when in suspend state. See the table on the right for pin definitions. You must have a WOR card and cable to use this feature.

| Wake-On-Ring Pin Definitions (JWOR) | |
|---|----------------|
| Pin# | Definition |
| 1 | Ground (Black) |
| 2 | Wake-up |

Power SMB (I²C) Connector

The Power SMB (I²C) connector (PW4) is used to monitor power supplies, fans and system temperatures. See the table on the right for pin definitions.

| PWR SMB (I ² C) Pin Definitions | |
|---|------------|
| Pin# | Definition |
| 1 | Clock |
| 2 | Data |
| 3 | PWR Fail |
| 4 | Ground |
| 5 | +3.3V |

Power Supply Fail

Connect a cable from your power supply to the Power Supply Fail header (PW3) to provide a warning of power supply failure. This warning signal is passed through the PWR_LED pin to indicate a power failure. See the table on the right for pin definitions.

| Power Supply Fail Pin Definitions (PW3) | |
|--|---------------------|
| Pin# | Definition |
| 1 | PWR 1: Fail |
| 2 | PWR 2: Fail |
| 3 | PWR 3: Fail |
| 4 | Signal: Alarm Reset |

Note: This feature is only available when using Supermicro redundant power supplies.

Alarm Reset (JAR)

The system will notify you in the event of a power supply failure. This feature assumes that Supermicro redundant power supply units are installed in the chassis. Connect a microswitch to the JAR header to disable the power supply fail alarm.

| Alarm Reset Pin Definitions (JAR) | |
|--------------------------------------|------------|
| Pin# | Definition |
| 1 | Ground |
| 2 | +5V |

LAN1/2 (Ethernet Ports)

Two Ethernet ports (designated LAN1 and LAN2) are located beside the VGA port on the I/O backplane. These ports accept RJ45 type cables.



Power LED

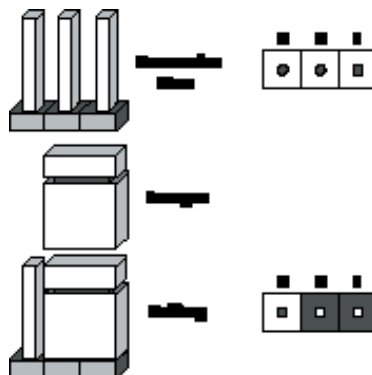
The Power LED connector is designated JLED. Connect an LED here for indication of power being supplied to the serverboard. See the table on the right for pin definitions.

| Power LED Pin Definitions (JLED) | |
|-------------------------------------|------------|
| Pin# | Definition |
| 1 | +5V |
| 2 | Key |
| 3 | Ground |

5-9 Jumper Settings

Explanation of Jumpers

To modify the operation of the serverboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the diagram at right for an example of jumping pins 1 and 2. Refer to the serverboard layout page for jumper locations.



Note: On two-pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.

CMOS Clear

JBT1 is used to clear CMOS and will also clear any passwords. Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

To clear CMOS,

- 1) First power down the system and unplug the power cord(s)
- 2) With the power disconnected, short the CMOS pads with a metal object such as a small screwdriver
- 3) Remove the screwdriver (or shorting device)
- 4) Reconnect the power cord(s) and power on the system.

Note: Do not use the PW_ON connector to clear CMOS.

VGA Enable/Disable

JPG1 allows you to enable or disable the VGA port. The default position is on pins 1 and 2 to enable VGA. See the table on the right for jumper settings.

| VGA Enable/Disable Jumper Settings (JPG1) | |
|---|------------|
| Jumper Setting | Definition |
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

LAN Enable/Disable

Change the setting of jumper JPL1 or JPL2 to enable or disable the onboard Ethernet (RJ45) ports LAN1 and LAN2, respectively. See the table on the right for jumper settings. The default setting is enabled

| LAN Enable/Disable Jumper Settings (JPL1, JPL2) | |
|--|------------|
| Jumper Setting | Definition |
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

Watch Dog Enable/Disable

JWD controls the Watch Dog function. Watch Dog is a system monitor that can reboot the system when a software application is “hung up”. Pins 1-2 will cause WD to reset the system if an application is hung up. Pins 2-3 will generate a non-maskable interrupt signal for the application that is hung up. See the table on the right for jumper settings. Watch Dog must also be enabled in BIOS.

Note: When enabled, the user needs to write their own application software to disable the Watch Dog Timer.

| Watch Dog Jumper Settings (JWD) | |
|------------------------------------|------------|
| Jumper Setting | Definition |
| Pins 1-2 | Reset |
| Pins 2-3 | NMI |
| Open | Disabled |

Power Force On Enable/Disable

Jumper JPF allows you to enable or disable the Power Force On function. If enabled, the power will always stay on automatically. If this function is disabled (the normal setting), the user needs to press the power button to power on the system.

| Power Force On Enable/Disable Jumper Settings (JPF) | |
|---|------------|
| Jumper Setting | Definition |
| Open | Normal |
| Closed | Force On |

5-10 Onboard Indicators

LAN1/LAN2 LEDs

The Ethernet ports (located beside the VGA port) have two LEDs. On each Gigabit LAN port, one LED indicates activity when blinking while the other LED may be green, amber or off to indicate the speed of the connection. See the table on the right for the functions associated with the connection speed LED.

| LAN LED Connection Speed Indicator | |
|---------------------------------------|------------|
| LED Color | Definition |
| Off | 10 MHz |
| Green | 100 MHz |
| Amber | 1 GHz |

LE1

The LE1 LED located under the UID button is the UID indicator LED. LE1 illuminates when UID is initiated either by the UID button or via IPMI. If initiated a second time, LE1 will turn off.

| UID LED Indicator (LE1) | |
|----------------------------|----------------------|
| LED | Definition |
| Off | Normal |
| On | UID button depressed |

When the LED blinks blue it means the signal was initiated via IPMI. If blue continuously it means a UID button initiated it.

PWR-LED

The PWR-LED is located next to the SEPC slot. Refer to the table on the right for indicator definitions.

| Power Indicator LED (PWR-LED) | |
|----------------------------------|------------------------------------|
| Color | Definition |
| Red | Power or CPU failure, CPU overheat |
| Amber | System off, power cable connected |
| Green | System on, operation normal |

5-11 Floppy, IDE and SATA Drive Connections

Note the following when connecting the floppy and hard disk drive cables:

- The floppy disk drive cable has seven twisted wires.
- A red mark on a wire typically designates the location of pin 1.
- A single floppy disk drive ribbon cable has 34 wires and two connectors to provide for two floppy disk drives. The connector with twisted wires always connects to drive A, and the connector that does not have twisted wires always connects to drive B.

Floppy Connector

The floppy connector is designated Floppy. See the table below for pin definitions.

| Floppy Drive Connector Pin Definitions (Floppy) | | | |
|--|------------|-------|----------------|
| Pin# | Definition | Pin # | Definition |
| 1 | Ground | 2 | FDHDIN |
| 3 | Ground | 4 | Reserved |
| 5 | Key | 6 | FDEDIN |
| 7 | Ground | 8 | Index |
| 9 | Ground | 10 | Motor Enable |
| 11 | Ground | 12 | Drive Select B |
| 13 | Ground | 14 | Drive Select B |
| 15 | Ground | 16 | Motor Enable |
| 17 | Ground | 18 | DIR |
| 19 | Ground | 20 | STEP |
| 21 | Ground | 22 | Write Data |
| 23 | Ground | 24 | Write Gate |
| 25 | Ground | 26 | Track 00 |
| 27 | Ground | 28 | Write Protect |
| 29 | Ground | 30 | Read Data |
| 31 | Ground | 32 | Side 1 Select |
| 33 | Ground | 34 | Diskette |

IDE Connector

There are no jumpers to configure the onboard IDE#1 connector. See the table on the right for pin definitions.

| IDE Drive Connector Pin Definitions (IDE#1) | | | |
|--|---------------|-------|---------------|
| Pin# | Definition | Pin # | Definition |
| 1 | Reset IDE | 2 | Ground |
| 3 | Host Data 7 | 4 | Host Data 8 |
| 5 | Host Data 6 | 6 | Host Data 9 |
| 7 | Host Data 5 | 8 | Host Data 10 |
| 9 | Host Data 4 | 10 | Host Data 11 |
| 11 | Host Data 3 | 12 | Host Data 12 |
| 13 | Host Data 2 | 14 | Host Data 13 |
| 15 | Host Data 1 | 16 | Host Data 14 |
| 17 | Host Data 0 | 18 | Host Data 15 |
| 19 | Ground | 20 | Key |
| 21 | DRQ3 | 22 | Ground |
| 23 | I/O Write | 24 | Ground |
| 25 | I/O Read | 26 | Ground |
| 27 | IOCHRDY | 28 | BALE |
| 29 | DACK3 | 30 | Ground |
| 31 | IRQ14 | 32 | IOCS16 |
| 33 | Addr1 | 34 | Ground |
| 35 | Addr0 | 36 | Addr2 |
| 37 | Chip Select 0 | 38 | Chip Select 1 |
| 39 | Activity | 40 | Ground |

SATA Ports

See the table on the right for pin definitions for the onboard SATA ports.

| SATA Port Pin Definitions (SATA0 ~ SATA3) | |
|--|------------|
| Pin # | Definition |
| 1 | Ground |
| 2 | TXP |
| 3 | TXN |
| 4 | Ground |
| 5 | RXN |
| 6 | RXP |
| 7 | Ground |

Notes

Chapter 6

Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC815TQ-R450U/SC815TQ-560U chassis. For component installation, follow the steps in the order given to eliminate the most common problems encountered. If some steps are unnecessary, skip ahead to the next step.

Tools Required

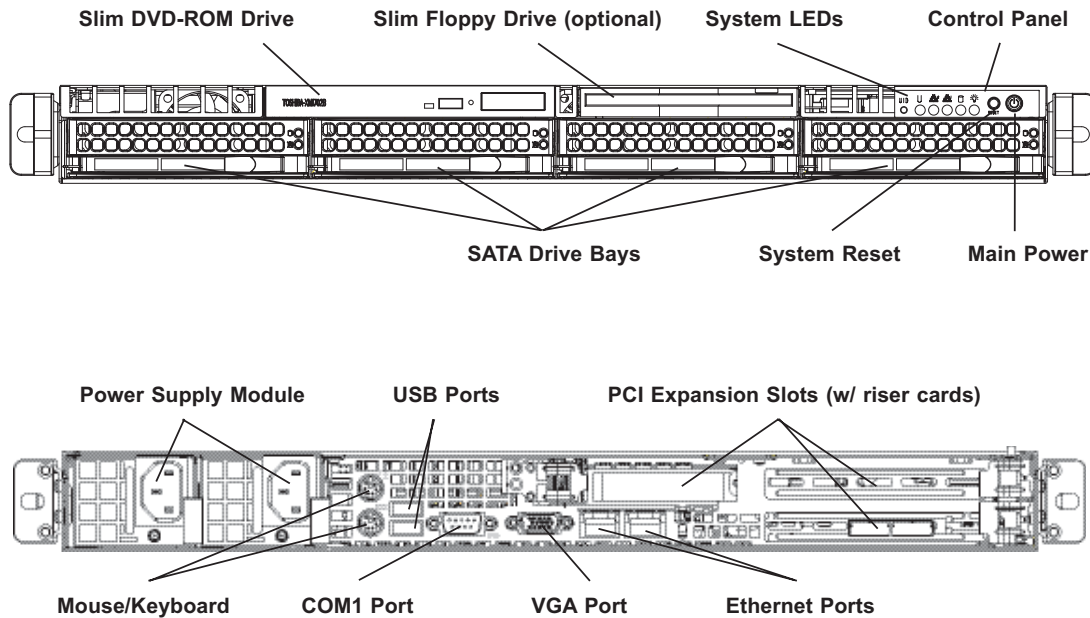
The only tool you will need to install components and perform maintenance is a Philips screwdriver.

6-1 Static-Sensitive Devices

Electrostatic discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully. The following measures are generally sufficient to protect your equipment from ESD damage.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

Figure 6-1. Chassis: Front and Rear Views

Note: the SC815TQ-560U chassis (5015M-U/5015M-NT) has only a single power supply module.

6-2 Control Panel

The control panel (located on the front of the chassis) must be connected to the JF1 connector on the serverboard to provide you with system status indications. These wires have been bundled together as a ribbon cable to simplify the connection. Connect the cable from JF1 on the serverboard to the appropriate header on the Control Panel PCB (printed circuit board). Make sure the red wire plugs into pin 1 on both connectors. Pull all excess cabling out of the airflow path.

The control panel LEDs inform you of system status. See "Chapter 3: System Interface" for details on the LEDs and the control panel buttons. Details on JF1 can be found in "Chapter 5: Advanced Serverboard Setup."

6-3 System Fans

Three 4-cm heavy duty counter-rotating fans provide the cooling for the SuperServer 5015M-UR/5015M-U/5015M-NTR/5015M-NT. Each fan unit is actually made up of two fans joined back-to-back, which rotate in opposite directions. This counter-rotating action generates exceptional airflow and works to dampen vibration levels. It is very important that the chassis top cover is properly installed and making a good seal in order for the cooling air to circulate properly through the chassis and cool the components. See Figure 6-2.

System Fan Failure

Fan speed is controlled by system temperature via a BIOS setting. If a fan fails, the remaining fans will ramp up to full speed and the Universal Information LED on the control panel will blink quickly. Replace any failed fan at your earliest convenience with the same type and model (the system can continue to run with a failed fan). Remove the top chassis cover while the system is still running to determine which of the fans has failed. Then power down the system before replacing a fan. Removing the power cords is also recommended as a safety precaution.

Replacing System Fans

1. Removing a fan

After turning off the power to the system, first remove the chassis cover and unplug the fan cable from the motherboard. Unscrew the failed blower fan from the chassis and pull it completely out from the serverboard.

2. Installing a new fan

Replace the failed fan with an identical 4-cm, 12 volt fan (available from Supermicro: p/n FAN-0086L). Push the new fan into the vacant space in the housing while making sure the arrows on the top of the fan (indicating air direction) point in the same direction as the arrows on the other fans. Reposition the fan housing back over the two mounting posts in the chassis, then reconnect the fan wires to the same chassis fan headers you removed them from. Power up the system and check that the fan is working properly and that the LED on the control panel has turned off. Finish by replacing the chassis cover.

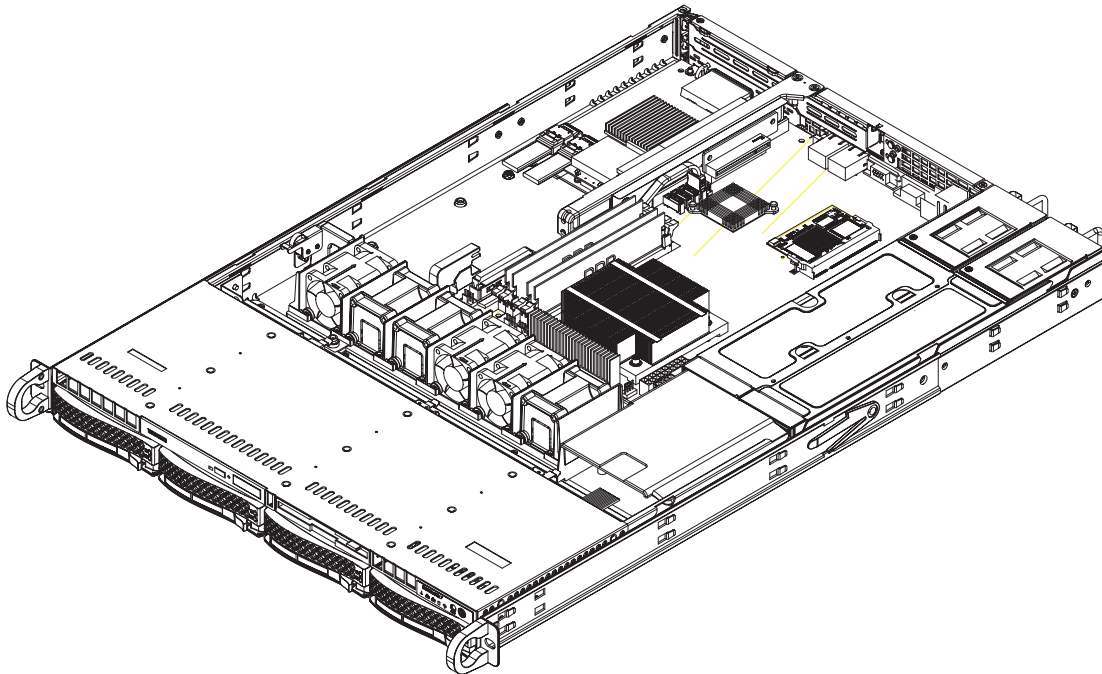


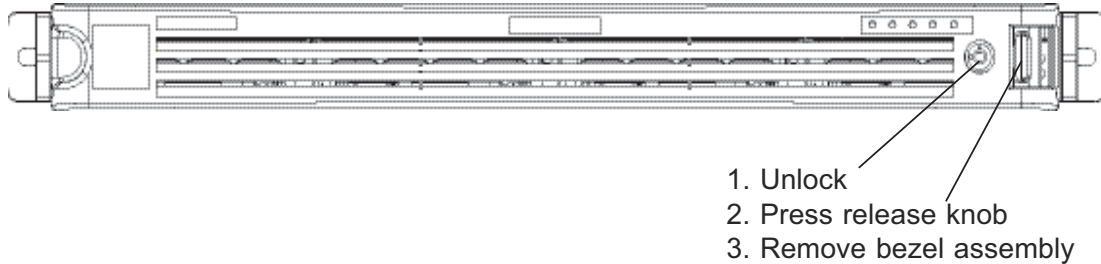
Figure 6-2. System Cooling Fans

Note: redundant power supply shown applies to 5015M-UR and 5015M-NTR only.

6-4 Drive Bay Installation/Removal

Removing the Front Bezel

If your system has a front bezel (optional) attached to the chassis, you must first remove it to gain access to the drive bays. To remove the bezel, first unlock the front of the chassis then press the release knob (see Figure 6-3). Carefully remove the bezel with both hands. A filter located within the bezel can be removed for replacement/cleaning. It is recommended that you keep a maintenance log of filter cleaning/replacement, since its condition will affect the airflow throughout the whole system.

Figure 6-3. Removing the Front Bezel

Accessing the Drive Bays

SATA Drives: Because of their hotswap capability, you do not need to access the inside of the chassis or power down the system to install or replace SATA drives. Proceed to the next section for instructions.

DVD-ROM/Floppy Disk Drives: For installing/removing a DVD-ROM or floppy disk drive, you will need to gain access to the inside of the 5015M-UR/5015M-U/5015M-NTR/5015M-NT by removing the top cover of the chassis. Proceed to the "DVD-ROM and Floppy Drive Installation" section later in this chapter for instructions.

Note: Only "slim" DVD-ROM and floppy drives will fit into the 5015M-UR/5015M-U/5015M-NTR/5015M-NT.

SATA Drive Installation

1. Mounting a SATA drive in a drive carrier

The SATA drives are mounted in drive carriers to simplify their installation and removal from the chassis. These carriers also help promote proper airflow for the drive bays. For this reason, even empty carriers without drives installed must remain in the chassis. To add a new drive, install a drive into the carrier with the printed circuit board side facing down so that the mounting holes align with those in the carrier. Secure the drive to the carrier with six screws, as shown in Figure 6-4.

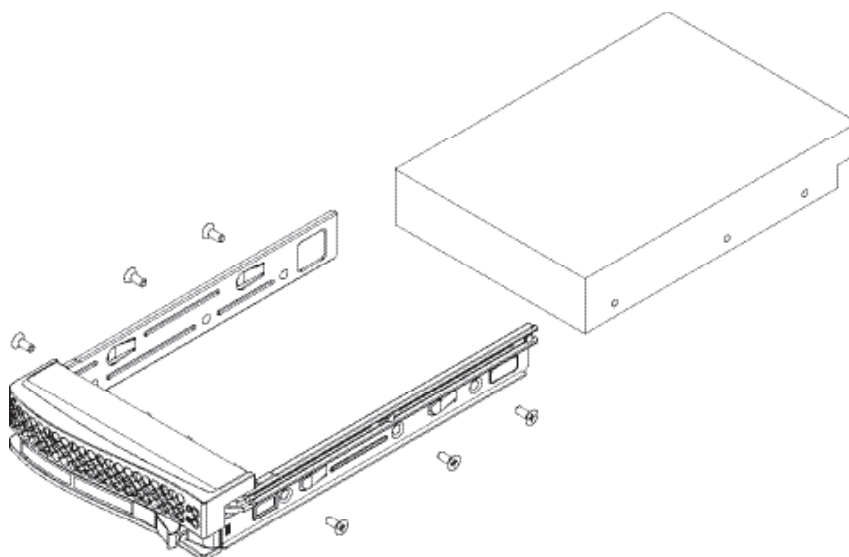


Figure 6-4. Mounting a SATA Drive in a Carrier



Use caution when working around the SATA backplane. Do not touch the backplane with any metal objects and make sure no ribbon cables touch the backplane or obstruct the holes, which aid in proper airflow.



Important: Regardless of how many SATA drives are installed, all drive carriers must remain in the drive bays to maintain proper airflow.

2. Installing/removing hot-swap SATA drives

The SATA drive carriers are all easily accessible at the front of the chassis. These hard drives are hot-pluggable, meaning they can be removed and installed without powering down the system. To remove a carrier, push the release button located beside the drive LEDs. Then swing the colored handle fully out and use it to pull the unit straight out (see Figure 6-5).

Note: Your operating system must have RAID support to enable the hot-plug capability of the SATA drives.

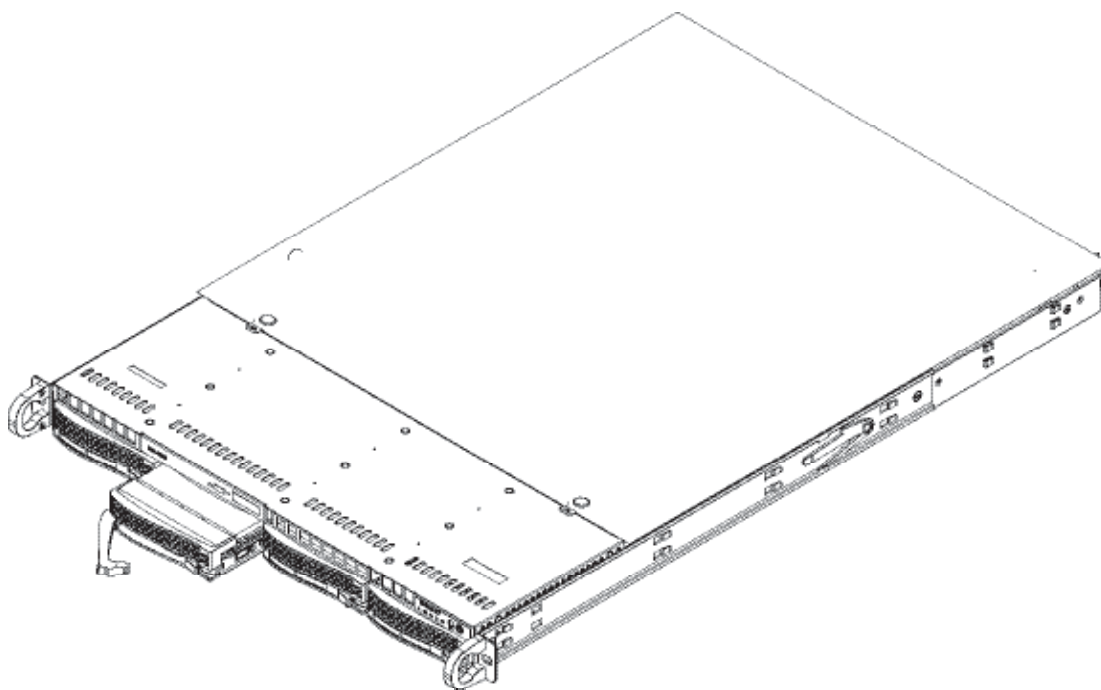


Figure 6-5. Removing a SATA Drive from the Server

DVD-ROM and Floppy Drive Installation

The top cover of the chassis must be opened to gain full access to the DVD-ROM and floppy drive bays. The 5015M-UR/5015M-U/5015M-NTR/5015M-NT accommodates only slim-line DVD-ROM drives. Side mounting brackets are needed to mount a slim-line DVD-ROM drive in the 5015M-UR/5015M-U/5015M-NTR/5015M-NT server.

You must power down the system before installing or removing a floppy or DVD-ROM drive. First, release the retention screws that secure the server unit to the rack. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a "click"). Next, depress the two buttons on the top of the chassis to release the top cover and at the same time, push the cover away from you until it stops. You can then lift the top cover from the chassis to gain full access to the inside of the server.

With the chassis cover removed, unplug the power and data cables from the drive you want to remove. Then locate the locking tab at the rear of the drive. It will be on the left side of the drive when viewed from the front of the chassis. Pull the tab away from the drive and push the drive unit out the front of the chassis. Add a new drive by following this procedure in reverse order. You may hear a faint *click* of the locking tab when the drive is fully inserted. Remember to reconnect the data and power cables to the drive before replacing the chassis cover and restoring power to the system. Please be aware of the following:

- The floppy disk drive cable has seven twisted wires.
- A color mark on a cable typically designates the location of pin 1.
- A single floppy disk drive ribbon cable has 34 wires and two connectors to provide for two floppy disk drives. The connector with twisted wires always connects to drive A, and the connector that does not have twisted wires always connects to drive B.

6-5 Power Supply

5015M-UR/5015M-NTR

The SuperServer 5015M-UR/5015M-NTR has a 450 watt redundant power supply configuration consisting of two hot-swap power modules. The power supply modules have an auto-switching capability, which enables them to automatically sense and operate with a 100V - 240V input voltage.

Power Supply Failure

If either of the two power supply modules fail, the other module will take the full load and allow the system to continue operation without interruption. The Universal Information LED on the control panel will blink red slowly and remain so until the failed module has been replaced. Replacement modules can be ordered directly from Supermicro (see contact information in the Preface). The power supply modules have a hot-swap capability, meaning you can replace the failed module without powering down the system.

Removing/Replacing the Power Supply

You do not need to shut down the system to replace a power supply module. The redundant feature will keep the system up and running while you replace the failed hot-swap module. Replace with the same model, which can be ordered directly from Supermicro (see Contact Information in the Preface).

1. Removing the power supply

First unplug the power cord from the failed power supply module. To remove the failed power module, push the release tab (on the back of the power supply) to the side and then pull the module straight out (see Figure 6-6). The power supply wiring was designed to detach automatically when the module is pulled from the chassis.

2. Installing a new power supply

Replace the failed power module with another PWS-451-1R power supply module. Simply push the new power supply module into the power bay until you hear a click. Finish by plugging the AC power cord back into the module.

5015M-U/5015M-NT

The SuperServer 5015M-U/5015M-NT has a single 560 watt power supply, which is auto-switching capable. This enables it to automatically sense and operate with a 100v - 240v input voltage.

Power Supply Failure

If the power supply module fails, the system will shut down and you will need to replace the module. Replacements can be ordered directly from Supermicro (see contact information in the Preface). As there is only one power supply module in the 5015M-U/5015M-NT, power must be completely removed from the server before removing and replacing the power supply for whatever reason.

Removing/Replacing the Power Supply

1. Removing the power supply

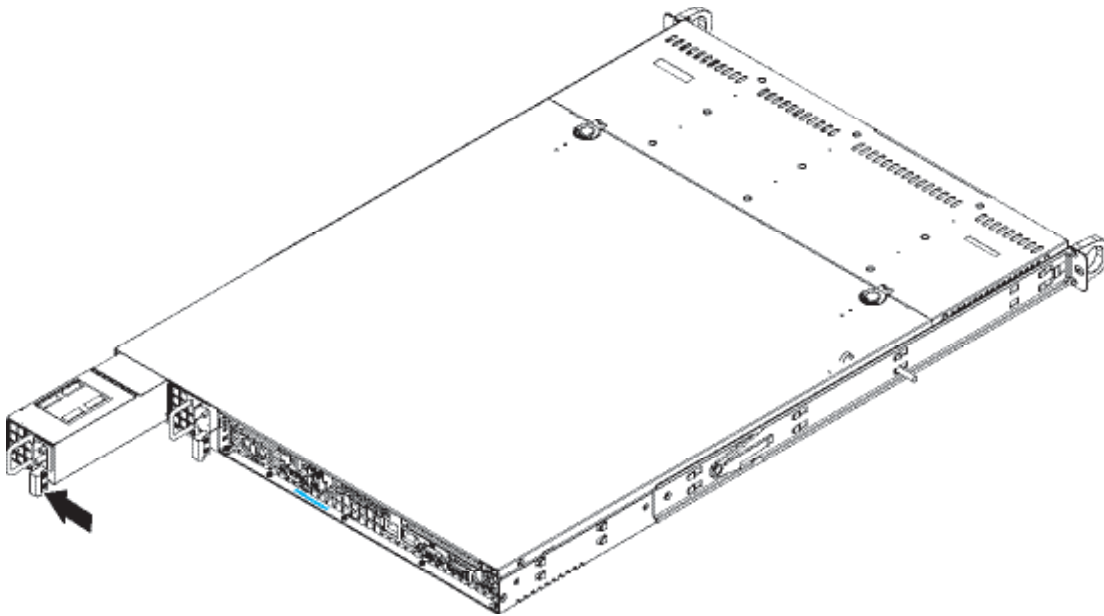
First turn the power switch on the control panel off, then unplug the power cord from the system. Replace with the same model (p/n PWS-561-1H20), which can be ordered directly from Supermicro (see Contact Information in the Preface).

To remove the failed power module, first remove the screws that secure the power supply to the chassis. Locate the colored release tab, push it to the right then pull the module straight out with the handle provided (see Figure 6-6, redundant power supply server shown). The power supply wiring was designed to detach automatically when the module is pulled from the chassis.

2. Installing a new power supply

Replace the failed power supply with another identical power supply module. Carefully insert the new power supply into the open bay and push it completely into the chassis until you hear a clicking sound, meaning it has been fully inserted. Secure it to the chassis with the screw you removed previously, then reconnect the AC power cord and depress the power button on the control panel to restart the system.

Figure 6-6. Removing/Replacing the Power Supply



Note: redundant power supply shown applies to 5015M-UR and 5015M-NTR only.

Notes

Chapter 7

BIOS

7-1 Introduction

This chapter describes the Phoenix BIOS™ Setup utility for the PDSMU. The Phoenix ROM BIOS is stored in a flash chip and can be easily upgraded using a floppy disk-based program.

Note: Due to periodic changes to the BIOS, some settings may have been added or deleted and might not yet be recorded in this manual. Please refer to the Super Micro web site for any changes to the BIOS that may not be reflected in this manual.

System BIOS

The BIOS is the Basic Input Output System used in all IBM® PC, XT™, AT®, and PS/2® compatible computers. The Phoenix BIOS utility stores the system parameters, types of disk drives, video displays, etc. in the CMOS. The CMOS memory requires very little electrical power. When the computer is turned off, a backup battery provides power to the CMOS Logic, enabling it to retain system parameters. Each time when the computer is powered on, the computer is configured with the values stored in the CMOS Logic by the system BIOS, which gains control at boot up.

How To Change the Configuration Data

The CMOS information that determines the system parameters may be changed by entering the BIOS Setup utility. This Setup utility can be accessed by pressing the <Delete> key at the appropriate time during system boot. (See below.)

Starting the Setup Utility

Normally, the only visible POST (Power On Self Test) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the BIOS Setup utility. From the main menu, you can access the other setup screens, such as the Security and Power menus. Beginning with Section 4-3, detailed descriptions are given for each parameter setting in the Setup utility.



Warning: To prevent possible boot failure, do not shut down or reset the system while updating BIOS.

7-2 Running Setup

Default settings are in bold text unless otherwise noted.

The BIOS setup options described in this section are selected by choosing the appropriate text from the main BIOS Setup screen. All displayed text is described in this section, although the screen display is often all you need to understand how to set the options (See the next page).

When you first power on the computer, the Phoenix BIOS™ is immediately activated.

While the BIOS is in control, the Setup program can be activated in one of two ways:

1. By pressing <Delete> immediately after turning the system on, or
2. When the message shown below appears briefly at the bottom of the screen during the POST (Power On Self-Test), press the <Delete> key to activate the main Setup menu:

Press the <Delete> key to enter Setup

7-3 Main BIOS Setup

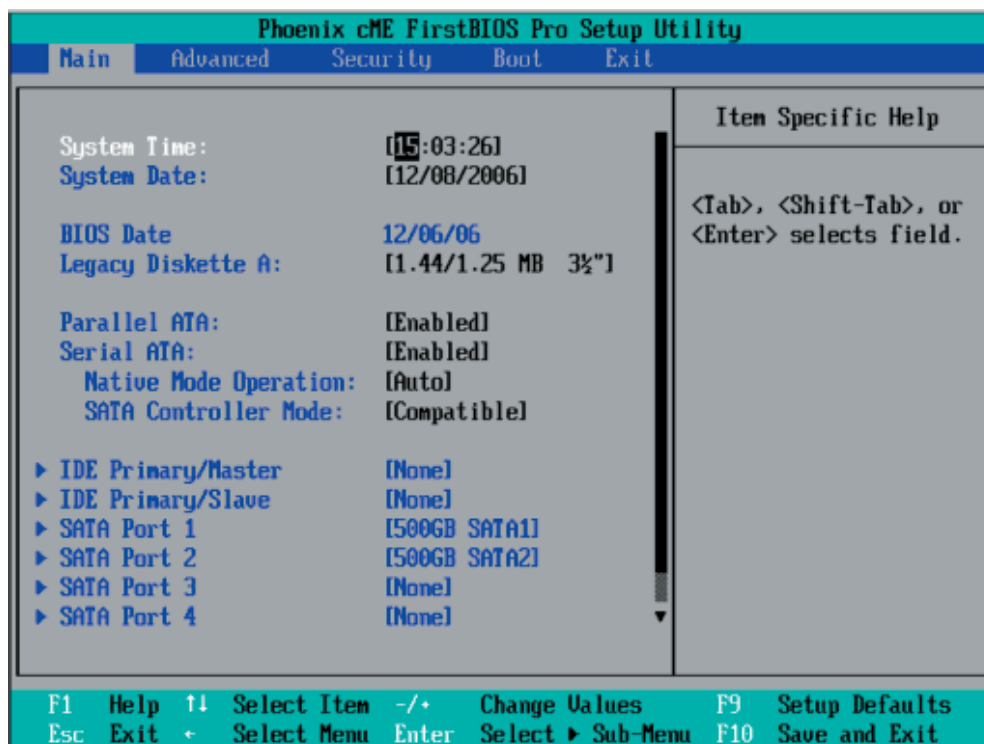
All main Setup options are described in this section. The main BIOS Setup screen is displayed below.

Use the Up/Down arrow keys to move among the different settings in each menu. Use the Left/Right arrow keys to change the options for each setting.

Press the <Esc> key to exit the CMOS Setup Menu. The next section describes in detail how to navigate through the menus.

Items that use submenus are indicated with the ► icon. With the item highlighted, press the <Enter> key to access the submenu.

Main BIOS Setup Menu



Main Setup Features

System Time

To set the system date and time, key in the correct information in the appropriate fields. Then press the <Enter> key to save the data.

System Date

Using the arrow keys, highlight the month, day and year fields, and enter the correct data. Press the <Enter> key to save the data.

BIOS Date

This field displays the date when this version of BIOS was built.

Legacy Diskette A

This setting allows the user to set the type of floppy disk drive installed as diskette A. The options are Disabled, 360Kb 5.25 in, 1.2MB 5.25 in, 720Kb 3.5 in, **1.44/1.25MB**, 3.5 in and 2.88MB 3.5 in.

Parallel ATA

This setting allows the user to enable or disable the function of Parallel ATA. The options are **Enabled** and Disabled.

Serial ATA

This setting allows the user to enable or disable the function of Serial ATA. The options are Disabled and **Enabled**.

Native Mode Operation

Select the native mode for ATA. The options are Serial ATA and **Auto**.

SATA Controller Mode

Select **Compatible** to allow the SATA and PATA drives to be automatically-detected and be placed in the Legacy Mode by the BIOS. Select **Enhanced** to allow the SATA and PATA drives to be to be automatically-detected and be placed in the Native IDE Mode. **Note:** Enhanced mode is supported by Windows 2000 OS or later.

When the SATA Controller Mode is set to Enhanced, the following items will display:

Serial ATA (SATA) RAID Enable

Select **Enable** to enable Serial ATA RAID Functions. (For a Windows OS environment, use the RAID driver if this feature is set to Enabled. When this item is set to Enabled, the item: "ICH RAID Code Base" will be available for you to select either Intel or Adaptec Host RAID firmware. If this item is set to **Disabled**, the item-SATA AHCI Enable will be available.) The options are Enabled and **Disabled**.

ICH RAID Code Base (Available when SATA RAID is Enabled.)

Select Intel to enable Intel's SATA RAID firmware. Select Adaptec to use Adaptec's Host RAID firmware. The options are **Intel** and Adaptec.

SATA AHCI (Available when SATA RAID is Disabled.)

Select **Enable** to enable the function of Serial ATA Advanced Host Interface. (Use caution when using this function. This feature is for advanced programmers only. The options are Enabled and **Disabled**.)

►IDE Primary Master/Slave, SATA Port 1, SATA Port 2, SATA Port 3 and SATA Port 4

These settings allow the user to set the parameters for the IDE Primary Master/Slave SATA Port 1, SATA Port 2, SATA Port 3 and SATA Port 4 slots. Hit <Enter> to activate the following sub-menu screen for detailed options of these items. Set the correct configurations accordingly. The items included in the sub-menu are:

Type

Selects the type of IDE hard drive. The option **Auto** will allow the BIOS to automatically configure the parameters of the HDD installed at the connection. Enter a number between 1 to 39 to select a predetermined HDD type. Select User to allow the user to enter the parameters of the HDD installed. Select CDROM if a CDROM drive is installed. Select ATAPI if a removable disk drive is installed.

Multi-Sector Transfers

This item allows the user to specify the number of sectors per block to be used in multi-sector transfer. The options are **Disabled**, 4 Sectors, 8 Sectors, and 16 Sectors.

LBA Mode Control

This item determines whether the Phoenix BIOS will access the IDE Channel 0 Master Device via the LBA mode. The options are Enabled and **Disabled**.

32 Bit I/O

This option allows the user to enable or disable the function of 32-bit data transfer. The options are Enabled and **Disabled**.

Transfer Mode

This option allows the user to set the transfer mode. The options are **Standard**, Fast PIO1, Fast PIO2, Fast PIO3, Fast PIO4, FPIO3/DMA1 and FPIO4/DMA2.

Ultra DMA Mode

This option allows the user to select Ultra DMA Mode. The options are **Disabled**, Mode 0, Mode 1, Mode 2, Mode 3, Mode 4, and Mode 5.

System Memory

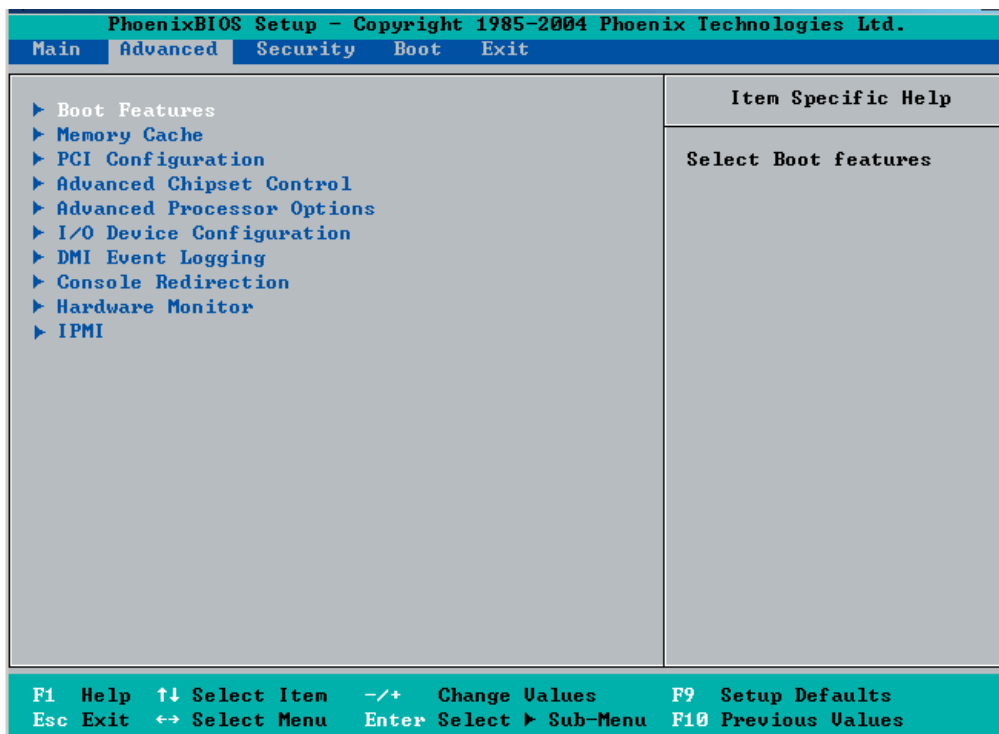
This display informs you how much system memory is recognized as being present in the system.

Extended Memory

This display informs you how much extended memory is recognized as being present in the system.

7-4 Advanced Setup

Choose Advanced from the Phoenix BIOS Setup Utility main menu with the arrow keys. You should see the following display. The items with a triangle beside them have sub menus that can be accessed by highlighting the item and pressing <Enter>.



► Boot Features

Access the submenu to make changes to the following settings.

QuickBoot Mode

If enabled, this feature will speed up the POST (Power On Self Test) routine by skipping certain tests after the computer is turned on. The settings are **Enabled** and Disabled. If Disabled, the POST routine will run at normal speed.

QuietBoot Mode

This setting allows you to **Enable** or Disable the graphic logo screen during boot-up.

ACPI Mode

Use the setting to determine if you want to employ ACPI (Advanced Configuration and Power Interface) power management on your system. The options are **Yes** and No.

Power Button Behavior

If set to **Instant-Off**, the system will power off immediately as soon as the user presses the power button. If set to 4-sec., the system will power off when the user presses the power button for 4 seconds or longer. The options are instant-off and 4-sec override.

Resume On Modem Ring

Select On to “wake your system up” when an incoming call is received by your modem. The options are **On** and Off.

Resume On PME#

Select On to allow your system be woken up when signals are received by the selected PME# of a PCI slot. The options are **On** and Off.

Power Loss Control

This setting allows you to choose how the system will react when power returns after an unexpected loss of power. The options are Stay Off, Power On, and **Last State**.

Watch Dog

If enabled, this option will automatically reset the system if the system is not active for more than 5 minutes. The options are Enabled and **Disabled**.

Summary Screen

This setting allows you to **Enable** or Disable the summary screen which displays the system configuration during bootup.

►Memory Cache

Cache System BIOS Area

This setting allows you to designate a reserve area in the system memory to be used as a System BIOS buffer to allow the BIOS to write (cache) data into this reserved memory area. Select **Write Protect** to enable this function, and this area will be reserved for BIOS ROM access only. Select Uncached to disable this function and make this area available for other devices.

Cache Video BIOS Area

This setting allows you to designate a reserve area in the system memory to be used as a Video BIOS buffer to allow the BIOS to write (cache) data into this reserved memory area. Select **Write Protect** to enable the function and this area will be reserved for Video BIOS ROM access only. Select Uncached to disable this function and make this area available for other devices.

Cache Base 0-512K

If enabled, this feature will allow the data stored in the base memory area: block 0-512K to be cached (written) into a buffer, a storage area in Static DRAM (SDRAM) or to be written into L1, L2 cache inside the CPU to speed up CPU operations. Select Uncached to disable this function. Select Write Through to allow data to be cached into the buffer and written into the system memory at the same time.

Select Write Protect to prevent data from being written into the base memory area of Block 0-512K. Select Write Back to allow the CPU to write data back directly from the buffer without writing data to the System Memory for fast CPU data processing and operation. The options are Uncached, Write Through, Write Protect, and **Write Back**.

Cache Base 512K-640K

If enabled, this feature will allow the data stored in the memory area: 512K-640K to be cached (written) into a buffer, a storage area in Static DROM (SDROM) or written into L1, L2, L3 cache inside the CPU to speed up CPU operations. Select Uncached to disable this function. Select Write Through to allow data to be cached into the buffer and written into the system memory at the same time. Select Write Protect to prevent data from being written into the base memory area of Block 512-640K. Select Write Back to allow the CPU to write data back directly from the buffer without writing data to the System Memory for fast CPU data processing and operation. The options are Uncached, Write Through, Write Protect, and **Write Back**.

Cache Extended Memory

If enabled, this feature will allow the data stored in the extended memory area to be cached (written) into a buffer, a storage area in Static DROM (SDROM) or written into L1, L2, L3 cache inside the CPU to speed up CPU operations. Select Uncached to disable this function. Select Write Through to allow data to be cached into the buffer and written into the system memory at the same time. Select Write Protect to prevent data from being written into the extended memory area above 1 MB. Select Write Back to allow the CPU to write data back directly from the buffer without writing data to the System Memory for fast CPU data processing and operation. The options are Uncached, Write Through, Write Protect, and **Write Back**.

Discrete MTRR Allocation

If enabled, MTRRs (-Memory Type Range Registers) are configured as distinct, separate units and cannot be overlapped. Set to Enabled to enhance graphic performance when using a Linux graphic driver that requires write-combining configuration with 4GB or more memory. The options are Enabled and **Disabled**.

►PCI Configuration

Access the submenu to make changes to the following settings for PCI devices.

Onboard GLAN1/Onboard GLAN2 (Gigabit- LAN) OPRM Configure

Enabling this option provides the capability to boot from the GLAN port specified. The options are **Disabled** and Enabled.

Reset Configuration Data

If set to Yes, this setting clears the Extended System Configuration Data- (ESCD) area. The options are Yes and **No**.

► Slot1 PCI-Exp. x8, Slot2 PCI-Exp. x8 and Slot3 PCI-Exp. x4

Access the submenu for each of the settings above to make changes to the following:

Option ROM Scan

When enabled, this setting will initialize the device expansion ROM. The options are **Enabled** and Disabled.

Enable Master

This setting allows you to enable the selected device as the PCI bus master. The options are **Enabled** and Disabled.

Latency Timer

This setting allows you to set the clock rate for Bus Master. A high-priority, high-throughput device may benefit from a greater clock rate. The options are **Default**, 0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, and 00E0h. For Unix, Novell and other Operating Systems, please select the option: other. If a drive fails after the installation of a new software, you might want to change this setting and try again. A different OS requires a different Bus Master clock rate.

Large Disk Access Mode

This setting determines how large hard drives are to be accessed. The options are **DOS** or Other (for Unix, Novelle NetWare and other operating systems).

► Advanced Chipset Control

Access the submenu to make changes to the following settings.



Warning: Use caution when changing the Advanced settings. Incorrect values entered may cause system malfunction. Also, a very high DRAM frequency or incorrect DRAM timing may cause system instability. When this occurs, revert to the default setting.

Clock Spectrum Feature

If Enabled, the BIOS will monitor the level of Electromagnetic Interference caused by the components and will attempt to decrease the interference whenever needed. The options are Enabled and **Disabled**.

ECC Conditions (Available when supported by the memory)

This setting specifies ECC Error conditions that will be treated as ECC Error Events. The options are None, Single Bit, **Multiple Bit**, and Both.

ECC Error Handler (Available when supported by the memory)

This setting allows you to select the type of interrupt to be activated when an ECC error occurs. The options are None, NMI (Non-Maskable Interrupt), **SMI** (System Management Interrupt) and SCI (System Control Interrupt.)

USB Function

Select Enabled to activate the USB devices specified. The settings are **Enabled** and Disabled.

Legacy USB Support

This setting allows you to enable support for Legacy USB devices. The settings are **Enabled** and Disabled.

►Advanced Processor Options

Access the submenu to make changes to the following settings.

CPU Speed

This is a display that indicates the speed of the installed processor.

Frequency Ratio (Available when supported by the CPU.)

The feature allows the user to set the internal frequency multiplier for the CPU. The options are: **Default** and x12.

Core-Multi-Processing (Available when supported by the CPU.)

Set to Enabled to use a processor's Second Core and beyond. (Please refer to Intel's web site for more information.) The options are Disabled and **Enabled**.

Machine Checking (Available when supported by the CPU.)

Set to Enabled to use this function which will allow the CPU to detect and report hardware (machine) errors via a set of model-specific registers (MSRs). The options are Disabled and **Enabled**.

Enhanced Intel EIST Support (Available when supported by the CPU.)

Select Enabled to use the Enhanced Intel SpeedStep Technology and allows the system to automatically adjust processor voltage and core frequency in an effort to reduce power consumption and heat dissipation. The options are Enabled and **Disabled**. Please refer to Intel's web site for detailed information.

Thermal Management 2 (Available when supported by the CPU.)

Set to **Enabled** to use Thermal Management 2 (TM2) which will lower the CPU voltage and frequency when the CPU temperature reaches a predefined overheat threshold. Set to Disabled to use Thermal Manager 1 (TM1), allowing CPU clocking to be regulated via CPU Internal Clock modulation when the CPU temperature reaches the overheat threshold.

Adjacent Cache Line Prefetch (Available when supported by the CPU.)

The CPU fetches the cache line for 64 bytes if this option is set to Disabled. The CPU fetches both cache lines for 128 bytes as comprised if Enabled. The default settings are **Disabled** for the Intel 5100 Series Processors and **Enable** for the 5000 Series Processors.

Set Maximum Extended CPUID=3

Select Enabled to set the Maximum Extended CPUID value to 3. The options are Enabled and **Disabled**.

C1 Enhanced Mode (Available when supported by the CPU.)

Set to Enabled to enable Enhanced Halt State to lower CPU voltage/frequency to prevent overheat. The options are **Enabled** and Disabled. **Note:** please refer to Intel's web site for detailed information.

Intel <R> Virtualization Technology (Available when supported by the CPU.)

Select Enabled to use the feature of Virtualization Technology to allow one platform to run multiple operating systems and applications in independent partitions, creating multiple "virtual" systems in one physical computer. The options are Enabled and **Disabled**. **Note:** If there is any change to this setting, you will need to power off and restart the system for the change to take effect. Please refer to Intel's web site for detailed information.

No Execute Mode Memory Protection (Available when supported by the CPU.)

Set to Enabled to allow the processor to classify areas in memory where an application code can execute and where it cannot, and thus preventing a worm or a virus from inserting and creating a flood of codes to overwhelm the processor or damage the system during an attack.

Note: this feature is available when your OS and your CPU support the function of Execute Disable Bit. The options are **Disabled** and Enabled. (For more information regarding hardware/software support for this function, please refer to Intel's and Microsoft's web sites.)

► I/O Device Configuration

Access the submenu to make changes to the following settings.

KBC Clock Input

This setting allows you to select clock frequency for KBC. The options are 6MHz, 8MHz, **12MHz**, and 16MHz.

Serial Port A

This setting allows you to assign control of serial port A. The options are **Enabled** (user defined), Disabled, and Auto (BIOS- or OS- controlled).

Base I/O Address

This setting allows you to select the base I/O address for serial port A. The options are **3F8**, 2F8, 3E8, and 2E8.

Interrupt

This setting allows you to select the IRQ (interrupt request) for serial port A. The options are IRQ3 and **IRQ4**.

Serial Port B

This setting allows you to assign control of serial port B. The options are **Enabled** (user defined), Disabled, Auto (BIOS controlled) and OS Controlled.

Mode

This setting allows you to set the type of device that will be connected to serial port B. The options are **Normal** and IR (for an infrared device).

Base I/O Address

This setting allows you to select the base I/O address for serial port B. The options are 3F8, **2F8**, 3E8 and 2E8.

Interrupt

This setting allows you to select the IRQ (interrupt request) for serial port B. The options are **IRQ3** and IRQ4.

Floppy Disk Controller

This setting allows you to assign control of the floppy disk controller. The options are **Enabled** (user defined), Disabled, and Auto (BIOS and OS controlled).

Base I/O Address

This setting allows you to select the base I/O address for the Floppy port. The options are **Primary** and Secondary.

► DMI Event Logging

Access the submenu to make changes to the following settings.

Event Log Validity

This is a display to inform you of the event log validity. It is not a setting.

Event Log Capacity

This is a display to inform you of the event log capacity. It is not a setting.

View DMI Event Log

Highlight this item and press <Enter> to view the contents of the event log.

Event Logging

This setting allows you to **Enable** or Disable event logging.

ECC Event Logging

This setting allows you to **Enable** or Disable ECC event logging.

Mark DMI Events as Read

Highlight this item and press <Enter> to mark the DMI events as read.

Clear All DMI Event Logs

Select Yes and press <Enter> to clear all DMI event logs. The options are Yes and **No**.

► Console Redirection

Access the submenu to make changes to the following settings.

COM Port Address

This item allows you to specify which COM port to direct the remote console to: Onboard COM A or Onboard COM B. This setting can also be **Disabled**.

BAUD Rate

This item allows you to set the BAUD rate for console redirection. The options are 300, 1200, 2400, 9600, **19.2K**, 38.4K, 57.6K, and 115.2K.

Console Type

This item allows you to set console redirection type. The options are VT100, VT100,8bit, PC-ANSI, 7bit, **PC ANSI**, VT100+, VT-UTF8 and ASCII.

Flow Control

This item allows you to select the flow control option for console redirection. The options are: None, XON/XOFF, and **CTS/RTS**.

Console Connection

This item allows you to decide how console redirection is to be connected: either **Direct** or Via Modem.

Continue CR after POST

Choose whether to continue with console redirection after the POST routine. The options are On and **Off**.

► Hardware Monitor Logic

Note: The Phoenix BIOS will automatically detect the type of CPU(s) and hardware monitoring chip used on the motherboard and will display the Hardware Monitoring screen accordingly.

CPU Temperature Threshold

This option allows the user to set a CPU temperature threshold that will activate the alarm system when the CPU temperature reaches this pre-set temperature threshold. The options are 75°C, **80°C**, 85°C and 90°C. Highlight this and hit <Enter> to see monitor data for the following items:

CPU Temperature/CPU Second Core Temperature

System Temperature

Fan1-Fan6 Speeds: If Auto Fan Control is enabled, the BIOS will automatically display the status of the fans indicated in this item.

Fan Speed Control Modes

This feature allows the user to decide how the system controls the speeds of the onboard fans. The CPU temperature and the fan speed are correlative. When the CPU on-die temperature increases, the fan speed will also increase, and vice versa. When this option is to 3-pin fan, the fan speed will be controlled by voltage. Select “Disable” to disable the fan speed control function and allow the onboard fans to constantly run at full speed (12V). If the option is set to 4-pin, the fan speed will be controlled by Pulse Width Modulation (PWM). Select 3-pin if your chassis came with 3-pin fan headers. Select 4-pin if your chassis came with 4-pin fan headers. Select Workstation if your system is used as a Workstation. Select Server if your system is used as a Server. Select Disable to disable fan speed control and allow the onboard fans to constantly run at full speed (12V). The Options are: **1. Disable**, 2. 3-pin (Server), 3. 3-pin (Workstation), 4. 4-pin (Server) and 5. 4-pin (Workstation).

Voltage Monitoring

The following items will be monitored and displayed:

Vcore, Vcc 1.5V, -12, Vcc 1.8V, +3.3V, +12V, 5Vsb, 5VDD, Vfsb, Vbat

7-5 Security

Choose Security from the Phoenix BIOS Setup Utility main menu with the arrow keys. You should see the following display. Security setting options are displayed by highlighting the setting using the arrow keys and pressing <Enter>. All Security BIOS settings are described in this section.

| PhoenixBIOS Setup Utility | |
|--|---|
| Main | Advanced |
| Security | Boot Exit |
| Supervisor Password Is: Clear | Item Specific Help Supervisor Password controls access to the setup utility. |
| User Password Is: Clear | |
| Set Supervisor Password [Enter] | |
| Set User Password [Enter] | |
| Password on boot: [Disabled] | |
| F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults Esc Exit + Select Menu Enter Select ► Sub-Menu F10 Save and Exit | |

Supervisor Password Is:

This item indicates if a supervisor password has been entered to the system. Clear means such a password has not been used, and Set means a supervisor password has been entered.

User Password Is:

This item indicates if a user password has been entered to the system. Clear means such a password has not been used, and Set means a user password has been entered.

Set Supervisor Password

When the item Set "Supervisor Password" is highlighted, press <Enter>. When prompted, type the Supervisor's password in the dialogue box to set or to change supervisor's password, which allows access to the BIOS.

Set User Password

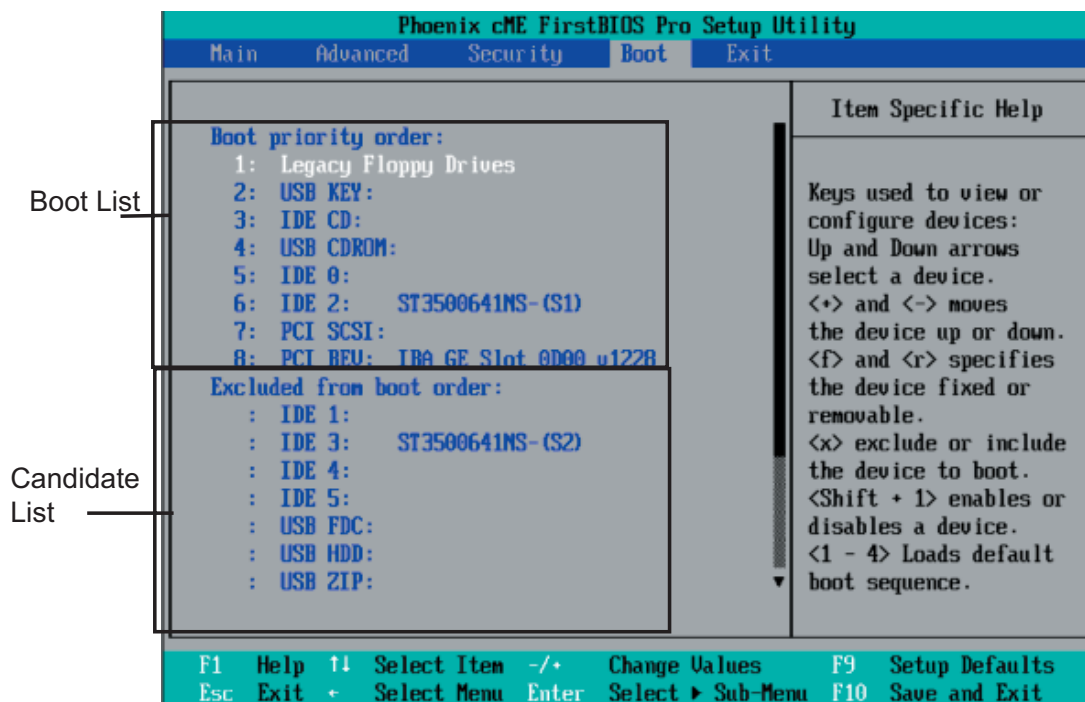
When the item-Set User Password is highlighted, press <Enter>. When prompted, type the user's password in the dialogue box to set or to change the user's password, which allows access to the system at boot-up.

Password on Boot

This setting allows you to decide if a password is required for a user to access the system at the boot-up. The options are **Enabled** (password required) and **Disabled** (password not required).

7-6 Boot

Choose Boot from the Phoenix BIOS Setup Utility main menu with the arrow keys. You should see the following display. See details on changing boot priority and devices in Specific Help Windows. All Boot BIOS settings are described in this section.

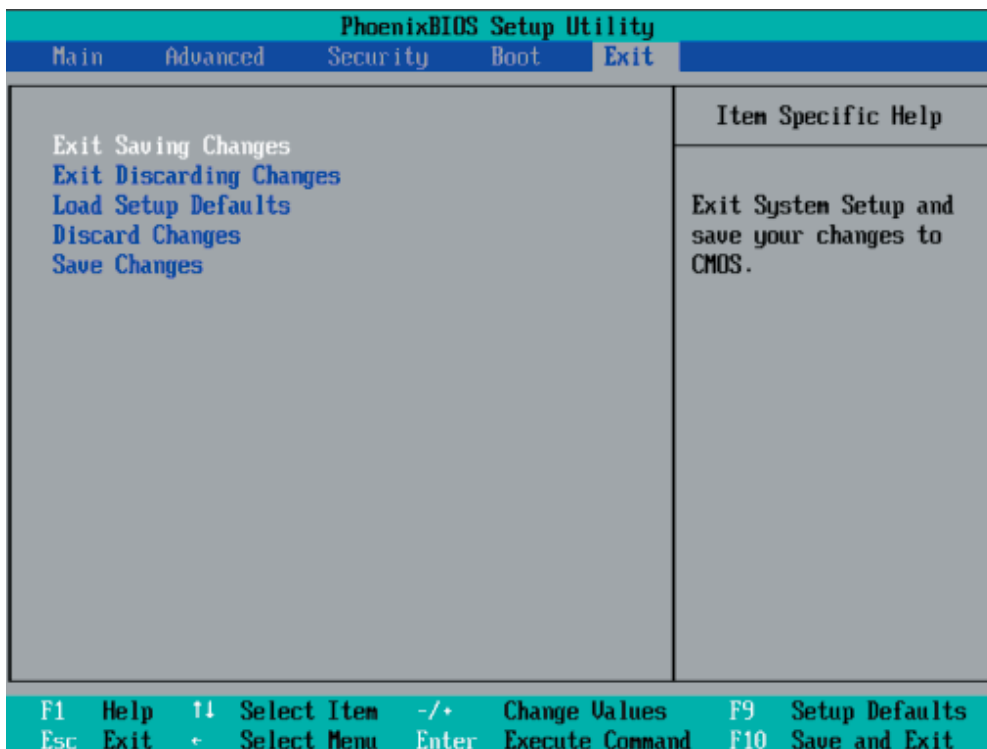


Boot Priority Order/Excluded from Boot Orders

The devices included in the boot list section (above) are bootable devices listed in the sequence of boot order as specified. The boot functions for the devices included in the candidate list (above) are currently disabled. Use a <+> key or a <-> key to move the device up or down. Use the <f> key or the <r> key to specify the type of an USB device, either fixed or removable. You can select one item from the boot list and hit the <x> key to remove it from the list of bootable devices (to make its resource available for other bootable devices). Subsequently, you can select an item from the candidate list and hit the <x> key to remove it from the candidate list and put it in the boot list. This item will then become a bootable device. See details on changing the boot priority order of a device in the "Item Specific Help" window.

7-7 Exit

Choose Exit from the Phoenix BIOS Setup Utility main menu with the arrow keys. You should see the following display. All Exit BIOS settings are described in this section.



Exit Saving Changes

Highlight this item and press <Enter> to save any changes you've made and to exit the BIOS Setup utility.

Exit Discarding Changes

Highlight this item and press <Enter> to exit the BIOS Setup utility without saving any changes you may have made.

Load Setup Defaults

Highlight this item and press <Enter> to load the default settings for all items in the BIOS Setup. These are the safest settings to use.

Discard Changes

Highlight this item and press <Enter> to discard (cancel) any changes you've made. You will remain in the Setup utility.

Save Changes

Highlight this item and press <Enter> to save any changes you've made. You will remain in the Setup utility.

Appendix A

BIOS POST Messages

During the Power-On Self-Test (POST), the BIOS will check for problems. If a problem is found, the BIOS will activate an alarm or display a message. The following is a list of such BIOS messages.

Failure Fixed Disk

Fixed disk is not working or not configured properly. Check to see if fixed disk is attached properly. Run Setup. Find out if the fixed-disk type is correctly identified.

Stuck key

Stuck key on keyboard.

Keyboard error

Keyboard not working.

Keyboard Controller Failed

Keyboard controller failed test. May require replacing keyboard controller.

Keyboard locked - Unlock key switch

Unlock the system to proceed.

Monitor type does not match CMOS - Run SETUP

Monitor type not correctly identified in Setup

Shadow Ram Failed at offset: nnnn

Shadow RAM failed at offset **nnnn** of the 64k block at which the error was detected.

System RAM Failed at offset: nnnn

System RAM failed at offset **nnnn** of the 64k block at which the error was detected.

Extended RAM Failed at offset: nnnn Extended memory not working or not configured properly at offset **nnnn**.

System battery is dead - Replace and run SETUP

The CMOS clock battery indicator shows the battery is dead. Replace the battery and run Setup to reconfigure the system.

System CMOS checksum bad - Default configuration used

System CMOS has been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS. The BIOS installed Default Setup Values. If you do not want these values, enter Setup and enter your own values. If the error persists, check the system battery or contact your dealer.

System timer error

The timer test failed. Requires repair of system board.

Real time clock error

Real-Time Clock fails BIOS hardware test. May require board repair.

Check date and time settings

BIOS found date or time out of range and reset the Real-Time Clock. May require setting legal date (1991-2099).

Previous boot incomplete - Default configuration used

Previous POST did not complete successfully. POST loads default values and offers to run Setup. If the failure was caused by incorrect values and they are not corrected, the next boot will likely fail. On systems with control of **wait states**, improper Setup settings can also terminate POST and cause this error on the next boot. Run Setup and verify that the waitstate configuration is correct. This error is cleared the next time the system is booted.

Memory Size found by POST differed from CMOS

Memory size found by POST differed from CMOS.

Diskette drive A error

Diskette drive B error

Drive A: or B: is present but fails the BIOS POST diskette tests. Check to see that the drive is defined with the proper diskette type in Setup and that the diskette drive is attached correctly.

Incorrect Drive A type - run SETUP

Type of floppy drive A: not correctly identified in Setup.

Incorrect Drive B type - run SETUP

Type of floppy drive B: not correctly identified in Setup.

System cache error - Cache disabled

RAM cache failed and BIOS disabled the cache. On older boards, check the cache jumpers. You may have to replace the cache. See your dealer. A disabled cache slows system performance considerably.

CPU ID:

CPU socket number for Multi-Processor error.

EISA CMOS not writeable

ServerBIOS2 test error: Cannot write to EISA CMOS.

DMA Test Failed

ServerBIOS2 test error: Cannot write to extended **DMA** (Direct Memory Access) registers.

Software NMI Failed

ServerBIOS2 test error: Cannot generate software NMI (Non-Maskable Interrupt).

Fail-Safe Timer NMI Failed

ServerBIOS2 test error: Fail-Safe Timer takes too long.

Device Address Conflict

Address conflict for specified **device**.

Allocation Error for: device

Run ISA or EISA Configuration Utility to resolve resource conflict for the specified **device**.

CD ROM Drive

CD ROM Drive identified.

Entering SETUP ...

Starting Setup program

Failing Bits: nnnn

The hex number **nnnn** is a map of the bits at the RAM address which failed the memory test. Each 1 (one) in the map indicates a failed bit. See errors 230, 231, or 232 above for offset address of the failure in System, Extended, or Shadow memory.

Fixed Disk n

Fixed disk **n** (0-3) identified.

Invalid System Configuration Data

Problem with NVRAM (CMOS) data.

I/O device IRQ conflict

I/O device IRQ conflict error.

PS/2 Mouse Boot Summary Screen:

PS/2 Mouse installed.

nnnn kB Extended RAM Passed

Where **nnnn** is the amount of RAM in kilobytes successfully tested.

nnnn Cache SRAM Passed

Where **nnnn** is the amount of system cache in kilobytes successfully tested.

nnnn kB Shadow RAM Passed

Where **nnnn** is the amount of shadow RAM in kilobytes successfully tested.

nnnn kB System RAM Passed

Where **nnnn** is the amount of system RAM in kilobytes successfully tested.

One or more I2O Block Storage Devices were excluded from the Setup Boot Menu

There was not enough room in the IPL table to display all installed I2O block-storage devices.

Operating system not found

Operating system cannot be located on either drive A: or drive C:. Enter Setup and see if fixed disk and drive A: are properly identified.

Parity Check 1 nnnn

Parity error found in the system bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays **????**. Parity is a method for checking errors in binary data. A parity error indicates that some data has been corrupted.

Parity Check 2 nnnn

Parity error found in the I/O bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays **????**.

Press <F1> to resume, <F2> to Setup, <F3> for previous

Displayed after any recoverable error message. Press <F1> to start the boot process or <F2> to enter Setup and change the settings. Press <F3> to display the previous screen (usually an initialization error of an **Option ROM**, i.e., an add-on card). Write down and follow the information shown on the screen.

Press <F2> to enter Setup

Optional message displayed during POST. Can be turned off in Setup.

PS/2 Mouse:

PS/2 mouse identified.

Run the I2O Configuration Utility

One or more unclaimed block storage devices have the Configuration Request bit set in the LCT. Run an I2O Configuration Utility (e.g. the SAC utility).

System BIOS shadowed

System BIOS copied to shadow RAM.

UMB upper limit segment address: *nnnn*

Displays the address *nnnn* of the upper limit of **Upper Memory Blocks**, indicating released segments of the BIOS which can be reclaimed by a virtual memory manager.

Video BIOS shadowed

Video BIOS successfully copied to shadow RAM.

Notes

Appendix B

BIOS POST Codes

This section lists the POST (Power On Self Test) codes for the Phoenix BIOS. POST codes are divided into two categories: recoverable and terminal.

Recoverable POST Errors

When a recoverable type of error occurs during POST, the BIOS will display an POST code that describes the problem. BIOS may also issue one of the following beep codes:

1 long and two short beeps - video configuration error

1 repetitive long beep - no memory detected

Terminal POST Errors

If a terminal type of error occurs, BIOS will shut down the system. Before doing so, BIOS will write the error to port 80h, attempt to initialize video and write the error in the top left corner of the screen. The following is a list of codes that may be written to port 80h.

| POST Code | Description |
|-----------|-------------|
|-----------|-------------|

| | |
|-----|---|
| 01h | IPMI Initialization |
| 02h | Verify Real Mode |
| 03h | Disable Non-Maskable Interrupt (NMI) |
| 04h | Get CPU type |
| 06h | Initialize system hardware |
| 07h | Disable shadow and execute code from the ROM. |
| 08h | Initialize chipset with initial POST values |
| 09h | Set IN POST flag |
| 0Ah | Initialize CPU registers |
| 0Bh | Enable CPU cache |
| 0Ch | Initialize caches to initial POST values |
| 0Eh | Initialize I/O component |
| 0Fh | Initialize the local bus IDE |
| 10h | Initialize Power Management |
| 11h | Load alternate registers with initial POST values |
| 12h | Restore CPU control word during warm boot |
| 13h | Reset PCI Bus Mastering devices |
| 14h | Initialize keyboard controller |
| 16h | 1-2-2-3 BIOS ROM checksum |
| 17h | Initialize cache before memory Auto size |

| POST Code | Description |
|------------------|--|
| 18h | 8254 timer initialization |
| 1Ah | 8237 DMA controller initialization |
| 1Ch | Reset Programmable Interrupt Controller |
| 20h | 1-3-1-1 Test DRAM refresh |
| 22h | 1-3-1-3 Test 8742 Keyboard Controller |
| 24h | Set ES segment register to 4 GB |
| 28h | Auto size DRAM |
| 29h | Initialize POST Memory Manager |
| 2Ah | Clear 512 kB base RAM |
| 2Ch | 1-3-4-1 RAM failure on address line xxxx * |
| 2Eh | 1-3-4-3 RAM failure on data bits xxxx * of low byte of memory bus |
| 2Fh | Enable cache before system BIOS shadow |
| 32h | Test CPU bus-clock frequency |
| 33h | Initialize Phoenix Dispatch Manager |
| 36h | Warm start shut down |
| 38h | Shadow system BIOS ROM |
| 3Ah | Auto size cache |
| 3Ch | Advanced configuration of chipset registers |
| 3Dh | Load alternate registers with CMOS values |
| 41h | Initialize extended memory for RomPilot (optional) |
| 42h | Initialize interrupt vectors |
| 45h | POST device initialization |
| 46h | 2-1-2-3 Check ROM copyright notice |
| 48h | Check video configuration against CMOS |
| 49h | Initialize PCI bus and devices |
| 4Ah | Initialize all video adapters in system |
| 4Bh | QuietBoot start (optional) |
| 4Ch | Shadow video BIOS ROM |
| 4Eh | Display BIOS copyright notice |
| 4Fh | Initialize MultiBoot |
| 50h | Display CPU type and speed |
| 51h | Initialize EISA board (optional) |
| 52h | Test keyboard |
| 54h | Set key click if enabled |
| 55h | Enable USB devices |
| 58h | 2-2-3-1 Test for unexpected interrupts |
| 59h | Initialize POST display service |
| 5Ah | Display prompt "Press <ESC> to enter SETUP" |
| 5Bh | Disable CPU cache |

| POST Code | Description |
|------------------|--|
| 5Ch | Test RAM between 512 and 640 kB |
| 60h | Test extended memory |
| 62h | Test extended memory address lines |
| 64h | Jump to UserPatch1 |
| 66h | Configure advanced cache registers |
| 67h | Initialize Multi Processor APIC |
| 68h | Enable external and CPU caches |
| 69h | Setup System Management Mode (SMM) area |
| 6Ah | Display external L2 cache size |
| 6Bh | Load custom defaults (optional) |
| 6Ch | Display shadow-area message |
| 70h | Display error messages |
| 72h | Check for configuration errors |
| 76h | Check for keyboard errors |
| 7Ch | Set up hardware interrupt vectors |
| 7Dh | Initialize Intelligent System Monitoring (optional) |
| 7Eh | Initialize coprocessor if present |
| 80h | Disable onboard Super I/O ports and IRQs (optional) |
| 81h | Late POST device initialization |
| 82h | Detect and install external RS232 ports |
| 83h | Configure non-MCD IDE controllers |
| 84h | Detect and install external parallel ports |
| 85h | Initialize PC-compatible PnP ISA devices |
| 86h | Re-initialize onboard I/O ports. |
| 87h | Configure Motherboard Configurable Devices (optional) |
| 88h | Initialize BIOS Data Area |
| 89h | Enable Non-Maskable Interrupts (NMIs) |
| 8Ah | Initialize Extended BIOS Data Area |
| 8Bh | Test and initialize PS/2 mouse |
| 8Ch | Initialize floppy controller |
| 8Fh | Determine number of ATA drives (optional) |
| 90h | Initialize hard-disk controllers |
| 91h | Initialize local-bus hard-disk controllers |
| 92h | Jump to UserPatch2 |
| 93h | Build MPTABLE for multi-processor boards |
| 95h | Install CD ROM for boot |
| 96h | Clear huge ES segment register |
| 97h | Fix up Multi Processor table |
| 98h | 1-2 Search for option ROMs and shadow if successful. One long, two short beeps on checksum failure |

| POST Code | Description |
|------------------|--|
| 99h | Check for SMART Drive (optional) |
| 9Ch | Set up Power Management |
| 9Dh | Initialize security engine (optional) |
| 9Eh | Enable hardware interrupts |
| 9Fh | Determine number of ATA and SCSI drives |
| A0h | Set time of day |
| A2h | Check key lock |
| A4h | Initialize typematic rate |
| A8h | Erase <ESC> prompt |
| AAh | Scan for <ESC> key stroke |
| ACh | Enter SETUP |
| AEh | Clear Boot flag |
| B0h | Check for errors |
| B1h | Inform RomPilot about the end of POST (optional) |
| B2h | POST done - prepare to boot operating system |
| B4h | 1 One short beep before boot |
| B5h | Terminate QuietBoot (optional) |
| B6h | Check password (optional) |
| B7h | Initialize ACPI BIOS and PPM Structures |
| B9h | Prepare Boot |
| BAh | Initialize SMBIOS |
| BCh | Clear parity checkers |
| BDh | Display MultiBoot menu |
| BEh | Clear screen (optional) |
| BFh | Check virus and backup reminders |
| C0h | Try to boot with INT 19 |
| C1h | Initialize POST Error Manager (PEM) |
| C2h | Initialize error logging |
| C3h | Initialize error display function |
| C4h | Initialize system error flags |
| C6h | Console redirection init. |
| C7h | Unhook INT 10h if console redirection enabled |
| C8h | Force check (optional) |
| C9h | Extended ROM checksum (optional) |
| CDh | Reclaim console redirection vector |

POST Code Description

| | |
|-----|--|
| D2h | Unknown interrupt |
| D4h | Check Intel Branding string |
| D8h | Alert Standard Format initialization |
| D9h | Late init for IPMI |
| DEh | Log error if micro-code not updated properly |

The following are for boot block in Flash ROM**POST Code Description**

| | |
|-----|--------------------------------------|
| E0h | Initialize the chipset |
| E1h | Initialize the bridge |
| E2h | Initialize the CPU |
| E3h | Initialize system timer |
| E4h | Initialize system I/O |
| E5h | Check force recovery boot |
| E6h | Checksum BIOS ROM |
| E7h | Go to BIOS |
| E8h | Set Huge Segment |
| E9h | Initialize Multi Processor |
| EAh | Initialize OEM special code |
| EBh | Initialize PIC and DMA |
| ECh | Initialize Memory type |
| EDh | Initialize Memory size |
| EEh | Shadow Boot Block |
| EFh | System memory test |
| F0h | Initialize interrupt vectors |
| F1h | Initialize Run Time Clock |
| F2h | Initialize video |
| F3h | Initialize System Management Manager |
| F4h | Output one beep |
| F5h | Clear Huge Segment |
| F6h | Boot to Mini DOS |
| F7h | Boot to Full DOS |

If the BIOS detects error 2C, 2E, or 30 (base 512K RAM error), it displays an additional word-bitmap (**xxxx**) indicating the address line or bits that failed. For example, "2C 0002" means address line 1 (bit one set) has failed. "2E 1020" means data bits 12 and 5 (bits 12 and 5 set) have failed in the lower 16 bits. The BIOS also sends the bitmap to the port-80 LED display. It first displays the checkpoint code, followed by a delay, the high-order byte, another delay, and then the loworder byte of the error. It repeats this sequence continuously.

Notes

Appendix C

Intel HostRAID

After the hardware has been installed, you must first configure Intel's ICH7R SATA RAID before you install Windows and software drivers.

Important Notes to the User

Note: If you do not wish to configure onboard SATA RAID functions, please go directly to Section C-2 for Operating System & Other Software Installation.

This chapter describes RAID configuration instructions for the Intel ICH RAID Controller designed for Windows OS. For Linux OS, please use the Adaptec HostRAID Utility.

To use the Adaptec HostRAID, please enable Adaptec's RAID Controller in BIOS and refer to the Adaptec HostRAID Utility and documentation included in the CD that came with your motherboard for instructions.

C-1 Introduction to Serial ATA and Parallel ATA

To configure the SATA RAID functions, you must first use the Intel ICH7R SATA RAID Utility program to configure the RAID level that you desire before installing Windows XP/2000/2003 and software drivers. (The necessary drivers are all included on the Super Micro CD that came with your motherboard.) Note that the current version of the ICH7R SATA RAID Utility can only support Windows XP/2000/2003.

Serial ATA (SATA)

Serial ATA (SATA) is a physical storage interface that uses a single cable with a minimum of four wires to create a point-to-point connection between devices. It is a serial link, which supports transfer rates up to 3Gbps. Because the serial cables used in SATA are thinner than the traditional cables used in Parallel ATA (PATA), SATA systems have better airflow and can be installed in smaller chassis than Parallel ATA. In addition, the cables used in PATA are limited to a length of 40cm, while Serial ATA cables can be up to one meter in length. Overall, SATA provides better functionality than PATA.

Introduction to Intel ICH7R Serial RAID

Located in the South Bridge of the Intel 3010 chipset, the I/O Controller Hub (ICH7R) provides the I/O subsystem with access to the rest of the system. It supports a 2-channel UltraATA/100 Bus Master IDE controller (PATA) and four Serial ATA (SATA) ports. The ICH7R supports the following PATA and SATA device configurations: Legacy mode and Native mode.

RAID Configurations

The following types of RAID configurations are supported:

RAID 0 (Data Striping): this writes data in parallel, interleaved ("striped") sections of two hard drives. Data transfer rate is doubled over using a single disk.

RAID1 (Data Mirroring): an identical data image from one drive is copied to another drive. The second drive must be the same size or larger than the first drive.

RAID 10 (Striping & Mirroring): RAID 0 and 1 schemes are combined (without parity information) to get the benefits of both.

RAID 5: both data and parity information are striped and mirrored across three or more hard drives.

Intel Matrix Storage

The Intel Matrix Storage, supported by the ICH7R, allows the user to create RAID 0 and RAID1 set by using only two identical hard disk drives. The Intel Matrix Storage Technology creates two partitions on each hard disk drive and generate a virtual RAID0 and RAID1 sets. It also allows you the change the HDD partition size without any data.

Configuring BIOS settings for SATA RAID Functions (Native Mode)

1. Press the key during system bootup to enter the BIOS Setup Utility.

Note: If it is the first time powering on the system, we recommend that you load the Optimized Default Settings. If you have already done so, please skip to Step 3.

2. Use the arrow keys to select the "Exit" Settings. Once in the "Exit" settings, Scroll down to select "Load Optimized Default Settings" and press the <Enter> key. Select "OK" to confirm the selection. Press the <Enter> key to load the default settings for the BIOS.

3. Use the arrow keys to select the "Main" section in BIOS.

4. Scroll down to "SATA Control Mode" and press the <Enter> key to select "Enhanced"

5. Scroll down to "SATA RAID Enabled" and press <Enter>. Then, select "Enabled."

6. Scroll down to "Exit". Select "Exit Saving Changes" from the "Exit" menu. Press the <Enter> key to save the changes and exit the BIOS.

7. Once you've exited the BIOS Utility, the system will re-boot.

8. During the system boot-up, press the <Ctrl> and <I> keys simultaneously to run the Intel RAID Configuration Utility when prompted by the following message: *Press <Ctrl> <I> for Intel RAID Configuration Utility.*

Using the Intel ICH7R SATA RAID Utility Program

1. Creating, Deleting and Resetting RAID Volumes

- a. After the system exits from the BIOS Setup Utility, the system will automatically reboot. The following screen appears after Power-On Self Test.

```

RAID Volumes:
None defined.

Physical Disks:
Port Drive Model      Serial #              Size   Type/Status(Vol ID)
0    WDC WD2500SD-01K  WD-WMAL72034971      232.9GB Non-RAID Disk
1    WDC WD2500SD-01K  WD-WMAL72034599      232.9GB Non-RAID Disk
2    WDC WD2500JD-00F  WD-WMAEH1376109      232.9GB Non-RAID Disk
3    WDC WD2500JD-00F  WD-WMAEH1449527      232.9GB Non-RAID Disk

Press <CTRL-I> to enter Configuration Utility...

Adaptec SCSI BIOS v4.30.0
Copyright 2003 Adaptec, Inc. All Rights Reserved.

<<< Press <Ctrl><A> for SCSISelect(TM) Utility! >>>

Slot Ch ID LUN  Vendor      Product              Size  Bus Status
-----
04  A  10  0

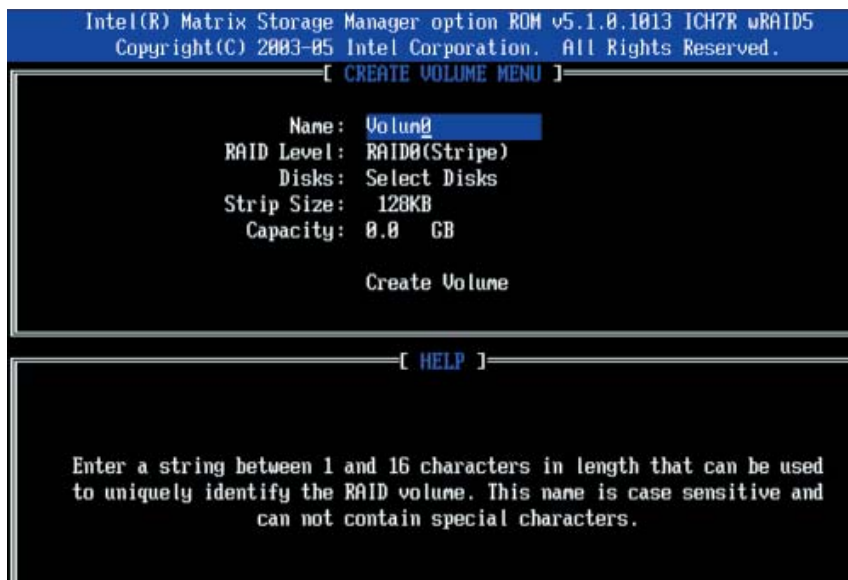
```

- b. When you see the above screen, press the <Ctrl> and the <I> keys simultaneously to have the main menu of the SATA RAID Utility appear:

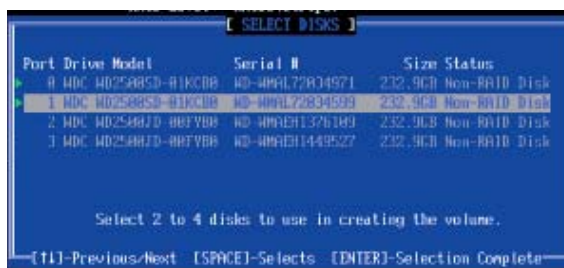
Note: All graphics and screen shots shown in the manual are for reference only. The screen shots shown in the manual do not imply Supernicro's endorsement or non-endorsement on any 3rd party's product. Your screens may or many not look exactly the same as the graphics shown in this manual.

Creating a RAID 0 Volume

- a. Select "Create RAID Volume" from the main menu and press the <Enter> key. The following screen will appear:



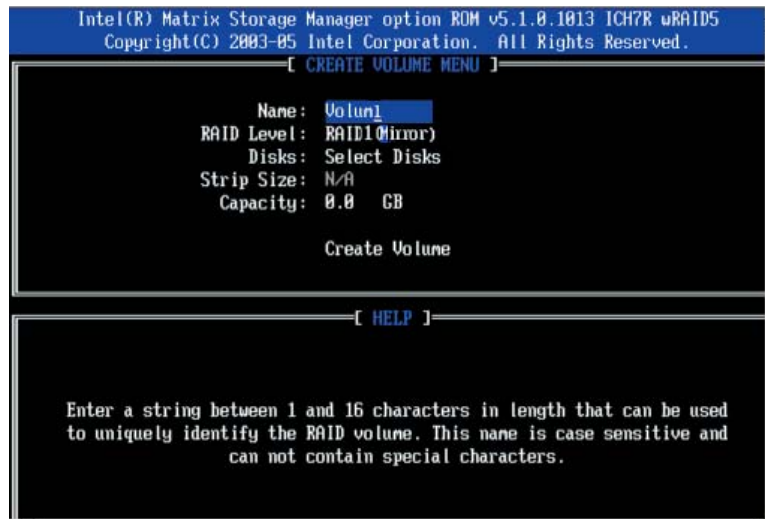
- b. Specify a name for the RAID 0 set and press the <Tab> key or the <Enter> key to go to the next field. (You can use the <Esc> key to select the previous menu.)
- c. When RAID Level item is highlighted, press the <Up Arrow>, <Down Arrow> keys to select RAID 0 (Stripe) and hit <Enter>.
- d. When the Disks item is highlighted, press <Enter> to select the HDD to configure as RAID. The following pop-up screen displays (see note on page C-3):



- e. Use the <Up Arrow>, <Down Arrow> keys to highlight a drive and press <Space> to select it. A triangle appears to confirm the selection of the drive.
- f. Use the <Up Arrow>, <Down Arrow> keys to select the stripe size, ranged from 4 KB to 128 KB for the RAID 0 array, and hit <Enter>. (**Note:** For a server, please use a lower stripe size, and for a multimedia system, use a higher stripe size. The default stripe size is 128 KB.)
- g. Press <Enter> when the Create Volume item is highlighted. A warning message displays.
- h. When asked "Are you sure you want to create this volume (Y/N), press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

Creating a RAID 1 Volume

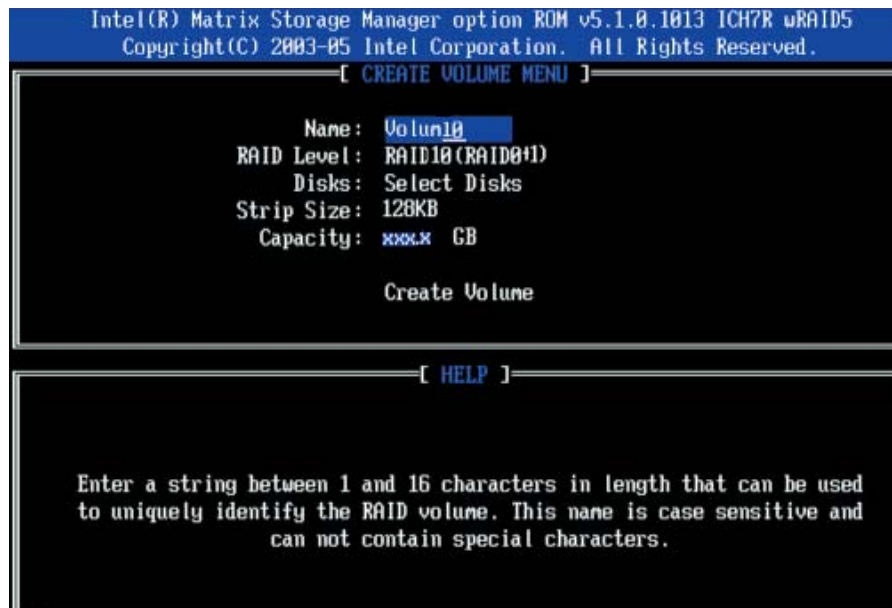
- a. Select "Create RAID Volume" from the main menu and press the <Enter> key. The following screen will appear:



- b. Specify a name for the RAID 1 set and press the <Tab> key or the <Enter> key to go to the next field. (You can use the <Esc> key to select the previous menu.)
- c. When RAID Level item is highlighted, press the <Up Arrow>, <Down Arrow> keys to select RAID 1 (Mirror) and hit <Enter>.
- d. When the Capacity item is highlighted, enter your RAID volume capacity and hit <Enter>. The default setting is the maximum capacity allowed.
- e. Press <Enter> when the Create Volume item is highlighted. A warning message displays.
- f. When asked "Are you sure you want to create this volume (Y/N)", press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

Creating a RAID 10 (RAID 1+ RAID 0)

- a. Select "Create RAID Volume" from the main menu and press the <Enter> key. The following screen will appear:



- b. Specify a name for the RAID 10 set and press <Enter>.
- c. When RAID Level item is highlighted, use the <Up Arrow>, <Down Arrow> keys to select RAID 10 (RAID1 + RAID0) and hit <Enter>.
- d. When the Stripe Size is highlighted, use the <Up Arrow>, <Down Arrow> keys to select the stripe size from 4 KB to 128 KB for your RAID 10 and hit <Enter>. The default setting is 6 4KB. (**Note:** For a server, please use a lower stripe size, and for a multimedia system, use a higher stripe size.)
- e. When the RAID Volume Capacity item is highlighted, enter your RAID volume capacity and hit <Enter>. The default setting is the maximum capacity allowed.
- f. Press <Enter> when the Create Volume item is highlighted. A warning message displays.
- g. When asked "Are you sure you want to create this volume (Y/N)", press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

Creating a RAID 5 Set (Parity)

- a. Select "Create RAID Volume" from the main menu and press the <Enter> key. The following screen will appear:



- b. Specify a name for the RAID 5 set and press <Enter>.
- c. When the Raid Level is highlighted, use the <Up Arrow>, <Down Arrow> keys to select RAID 5 (Parity) and hit <Enter>.
- d. When the Disk item is highlighted, press <Enter> to select the HDD to configure as RAID. The following pop-up screen as shown on page C-4 displays (see note on page C-3):
- e. Use the <Up Arrow>, <Down Arrow> keys to highlight a drive and press <Space> to select it. A triangle appears to confirm the selection of the drive.
- f. Use the <Up Arrow>, <Down Arrow> keys to select the stripe size, ranged from 4 KB to 128 KB for the RAID 5 array, and hit <Enter>. (**Note:** For a server, please use a lower stripe size, and for a multimedia system, use a higher stripe size. The default stripe size is 128 KB.)
- g. Enter your desired RAID volume capacity and press <Enter> when the capacity item is highlighted. The default setting is the maximum capacity allowed.
- h. Press Enter when the Create Volume item is highlighted. A warning message displays.
- i. When asked "Are you sure you want to create this volume (Y/N)", press "Y" to create the RAID volume, or type "N" to go back to the Create Volume menu.

Deleting a RAID Volume



Warning: Be sure to back up your data before deleting a RAID set. You will lose all data on the disk drives when deleting a RAID set.

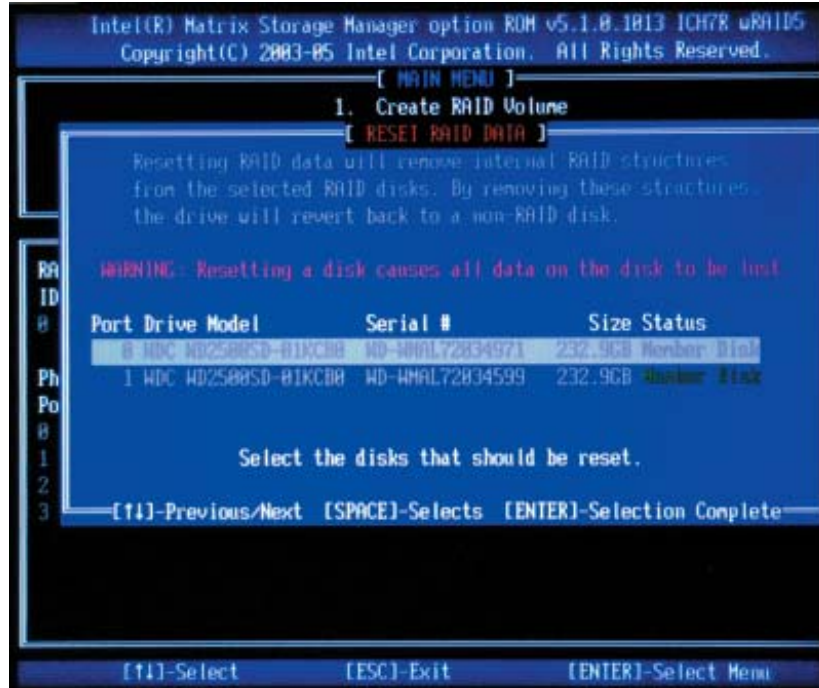
- a. From the main menu, select item2-Delete RAID Volume, and press <Enter>.
- b. Use the <Up Arrow>, <Down Arrow> keys to select the RAID set you want to delete and press . A Warning message displays.
- c. When asked "Are you sure you want to delete this volume (Y/N), press "Y" to delete the RAID volume, or type "N" to go back to the Delete Volume menu.

Resetting to Non-RAID and Resetting a RAID HDD



Warning: Be cautious when you reset a RAID volume HDD to non-RAID or Resetting a RAID HDD. Resetting a RAID volume HDD or Resetting a RAID HDD will reformat the HDD and delete all internal RAID configurations on the drive.

- a. From the main menu, select item3-Reset Disks to Non- RAID, and press <Enter>. The following screen will appear:



- b. Use the <Up Arrow>, <Down Arrow> keys to highlight the RAID set drive to reset and press <Space> to select.
- c. Press <Enter> to reset the RAID set drive. A Warning message displays.
- d. Press "Y" to reset the drive, or type "N" to go back to the main menu.

Exiting the Intel Matrix Storage Manager Utility

- a. From the main menu, select item4-Exit, and press <Enter>. A warning message will appear.
- b. Press "Y" to reset the drive, or type "N" to go back to the main menu.

C-2 Installing Windows XP/2000/2003 for RAID Systems

New Operating System-Windows XP/2000/2003 Installation

- a. Insert Microsoft Windows XP/2000/2003 Setup CD in the CD Driver, and the system will start booting up from CD.
- b. Press the <F6> key when the message-" Press F6 if you need to install a third party SCSI or RAID driver" displays.
- c. When the Windows XP/2000/2003 Setup screen appears, press "S" to specify additional device(s).
- d. Insert the driver diskette-"Intel AA RAID XP/2000/2003 Driver for ICH7R into Drive A: and press the <Enter> key.
- e. Choose Intel(R)82801GR/GH *SATA RAID Controller* from the list indicated in the XP/2000/2003 Setup Screen, and press the <Enter> key.
- f. Press the <Enter> key to continue the installation process. (If you need to specify any additional devices to be installed, do it at this time.) Once all devices are specified, press the <Enter> key to continue with the installation.
- g. From the Windows XP/2000/2003 Setup screen, press the <Enter> key. The XP/2000/2003 Setup will automatically load all device files and then continue the Windows XP/2000/2003 installation.
- h. After Windows XP/2000/2003 Installation is completed, the system will automatically reboot.
- i. Insert Super Micro CD that came with the package into the CD Drive during system reboot, and the Super Micro Main Screen will appear.

Note: the current version of the ICH7R SATA RAID Utility can only support Windows XP/2000/2003 Operating Systems.

Appendix D

Adaptec HostRAID Setup Guidelines

After all the hardware has been installed, you must first configure the Adaptec Embedded SATA RAID before you install the Windows operating system. The necessary drivers are all included on the Super Micro bootable CDs that came packaged with your serverboard. **Note:** The following section provides information on the Adaptec SATA RAID Driver based on the Intel ICH7R South Bridge Controller.

D-1 Introduction to the Intel ICH7R I/O Controller Hub

Located in the South Bridge of the Intel 3010 Chipset, the ICH7R I/O controller hub provides the I/O subsystem with access to the rest of the system. It supports a single-channel Ultra ATA/100 Bus Master IDE controller (PATA) and an Adaptec SATA Host controller, which supports up to six Serial ATA drives, up to two RAID volumes and up to four drives in RAID configurations. (See the table below for details.)

| Raid Level | Create Via | When Appropriate |
|--------------------|------------|--|
| RAID 0 | Quick Init | Creating a RAID 0 on new drives |
| RAID 0 | Migrate* | Creating a RAID 0 from one new drive and one drive with data you wish to preserve |
| RAID 1 | Build* | Any time you wish to create a RAID 1, but especially if you have data on one drive that you wish to preserve |
| RAID 1, RAID 10 | Clear | Creating a RAID 1 or RAID 10 on new drives, or when you want to ensure that the array contains no data after creation. |
| RAID 1, RAID 10 | Quick Init | Fastest way to create a RAID 1 or RAID 10 Appropriate when using new drives |

Configuring the Adaptec SATA RAID

1. Press the key during system bootup to enter the BIOS Setup Utility.

Note: If this is the first time you power on the system, we recommend that you load the Optimized Default Settings. If you have already done so, please skip to Step 3.

2. Use the arrow keys to select the "Exit" Settings. Once in the "Exit" settings, Scroll down to select "Load Optimized Default Settings" and press the <Enter> key. Select "OK" to confirm the selection. Press <Enter> to load the BIOS default setting.

3. Use the arrow keys to select the "Main" section in BIOS.

4. Scroll down to "SATA Control Mode" and press <Enter> to select "Enhanced"

5. Scroll down to "SATA RAID Enabled" and press <Enter>. Then, select "Enabled."

6. Scroll down to "ICH RAID Codebase" and select "Adaptec". Then press <Enter>. (For Adaptec ICH RAID configurations: Change the setting from Intel to Adaptec.)

7. Scroll down to "Exit". Select "Exit Saving Changes" from the "Exit" menu. Press the <Enter> key to save the changes and exit the BIOS.

8. Once you've exited the BIOS Utility, the system will reboot.

9. During the system bootup, press the <Ctrl> and <A> keys simultaneously to run the Intel RAID Configuration Utility when prompted by the following message: *Press <Ctrl> <A> for Adaptec RAID Configuration Utility.*

Adaptec Embedded SATA with HostRAID Controller Driver

The Adaptec Embedded Serial ATA RAID controller adds SATA/RAID functionality and performance enhancements to a motherboard. RAID striping (RAID 0) allows data to be written across multiple drives, greatly improving hard disk I/O performance. RAID mirroring (RAID 1) allows data to be simultaneously written to two drives, improving data security even if a single hard disk fails. A Stripe of Mirrors (RAID 10) provides multiple RAID 1 mirrors and a RAID 0 stripe, maximizing data security and system efficiency. By incorporating the Adaptec Embedded Serial ATA into the motherboard design, Supermicro's PDSMU offers the user the benefits of SATA RAID without the high costs associated with hardware RAID applications.

Using the Adaptec RAID Configuration Utility (ARC)

The Adaptec RAID Configuration Utility, an embedded BIOS Utility, includes the following:

Array Configuration Utility: Use this utility to create, configure and manage arrays.

Disk Utilities: Use this option to format or verify disks.

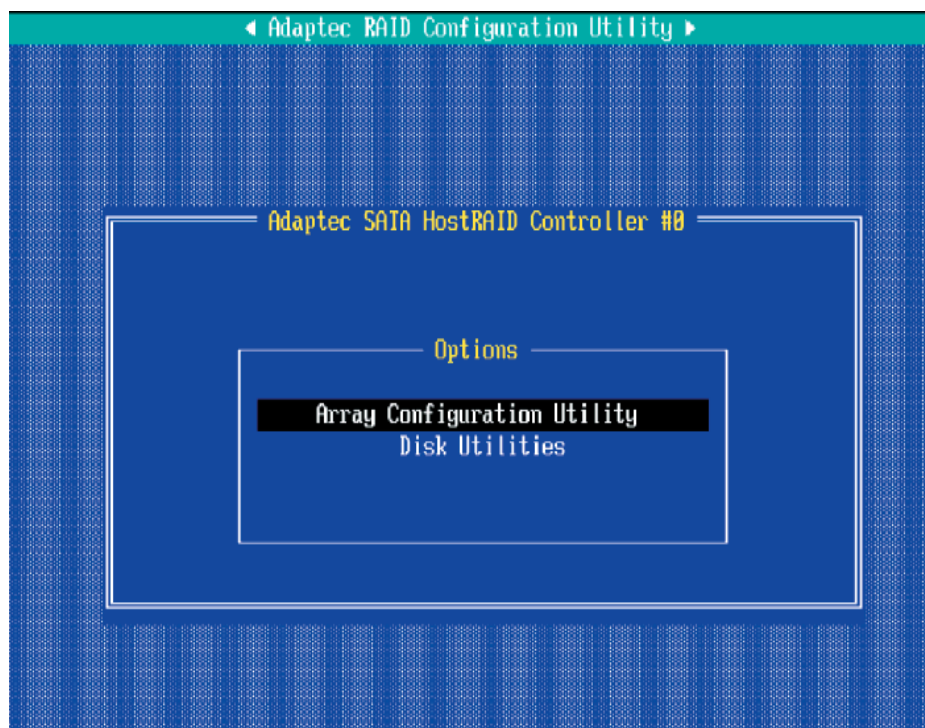
To run the Adaptec RAID Configuration Utility, you will need to do the following:

1. Enable RAID functions in the system BIOS (refer to Chapter 4 for System BIOS Configurations).
2. Press the <Ctrl> and <A> keys simultaneously when prompted during system boot. (Refer to the previous page for detailed instructions.)

Using the Array Configuration Utility (ACU)

When you press <Ctrl> and <A> keys simultaneously at the prompt during system bootup, the main menu will appear.

Note: To select an option, use the arrow keys to highlight the item and then press the <Enter> key to select it. To return to the previous menu, press the <ESC> key. Press the <Insert> key to select a drive. When a drive is highlighted (selected), press the <Delete> key to de-select it.



Managing Arrays

Select this option to view array properties, and configure array settings.

To select this option, using the arrow keys and the <enter> key, select "Managing Arrays" from the main menu as shown above.



Configuring Disk Drives

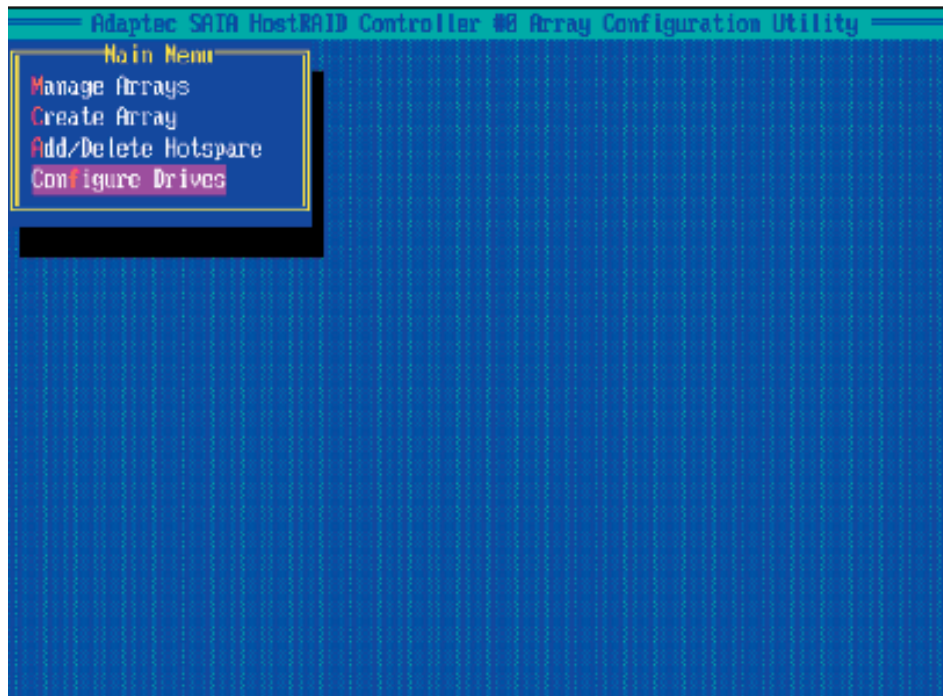
You may need to configure a disk drive before you can use it.

Caution: Configuring a disk may overwrite the partition table on the disk and may make any data on the disk inaccessible. If the drive is used in an array, you may not be able to use the array again.

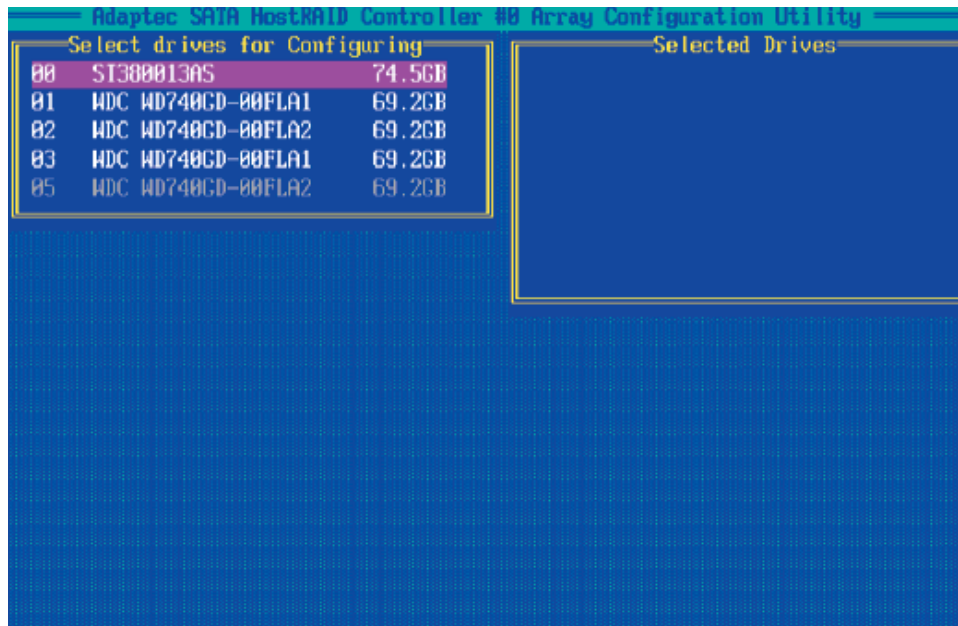
Note: Do not configure a disk that is part of a boot array! To determine which disks are associated with a particular array, please refer to the section: [Viewing Array Properties](#).

To configure a disk drive

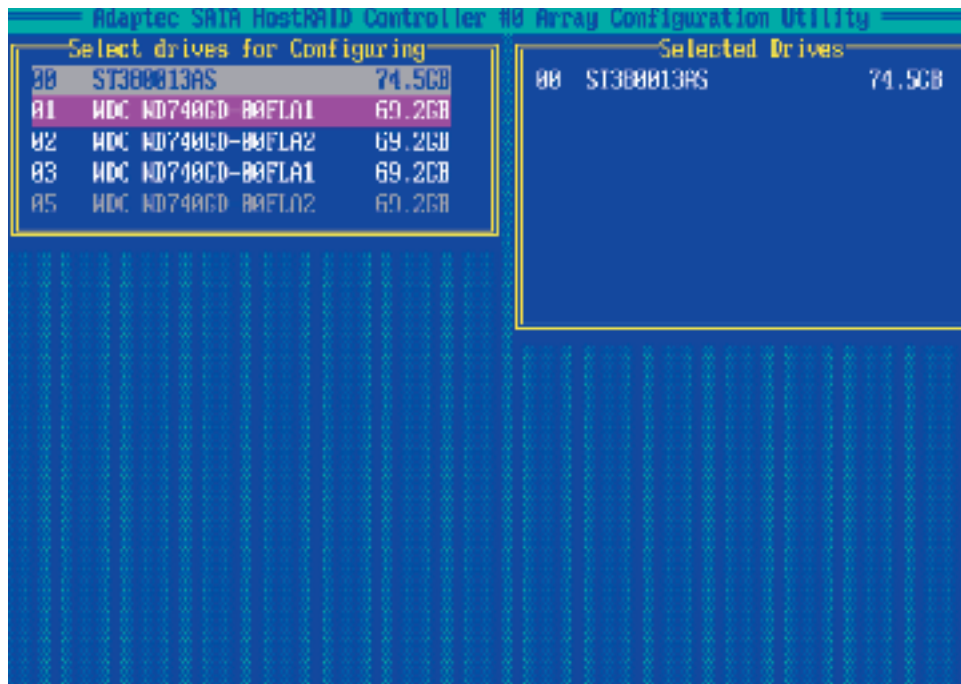
1. From the main menu (shown on page D-4), select **Configure Drives** and hit **<Enter>** (as shown below.)



- From the "Select Drives for Configuring" List (shown below,) select the drives you want to configure and press **<Insert>**.

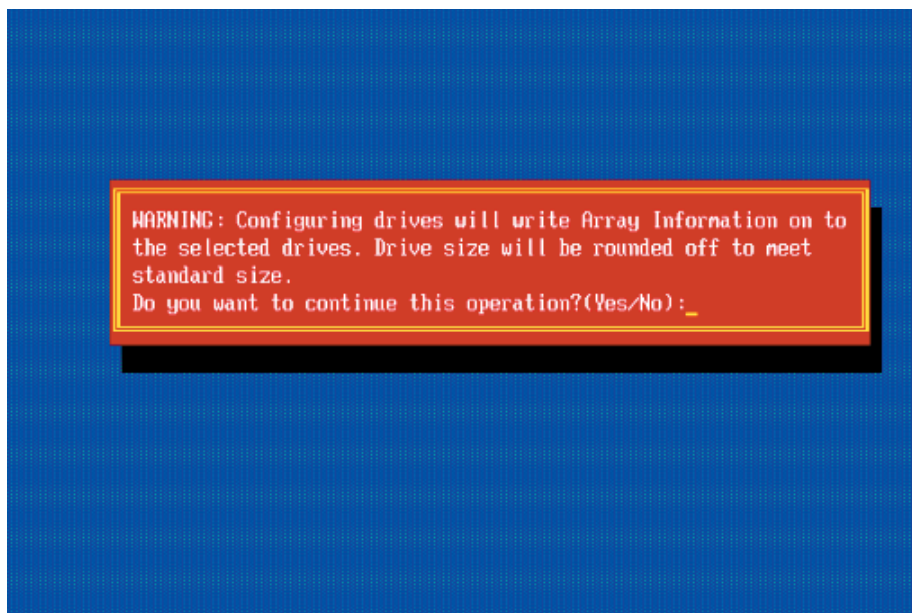


- The drive you've selected will appear in the "Selected Drives Dialog Box" on the right (as shown below.) Repeat the same steps until all drives that you want to configure appear in the selected drives box.



- Once both drives display in the selected drive box, press **<Enter>**

5. Read the warning message as shown in the screen below.



6. Make sure that you have selected the correct disk drives to configure. If correct, type **Y** to continue.

Creating Arrays

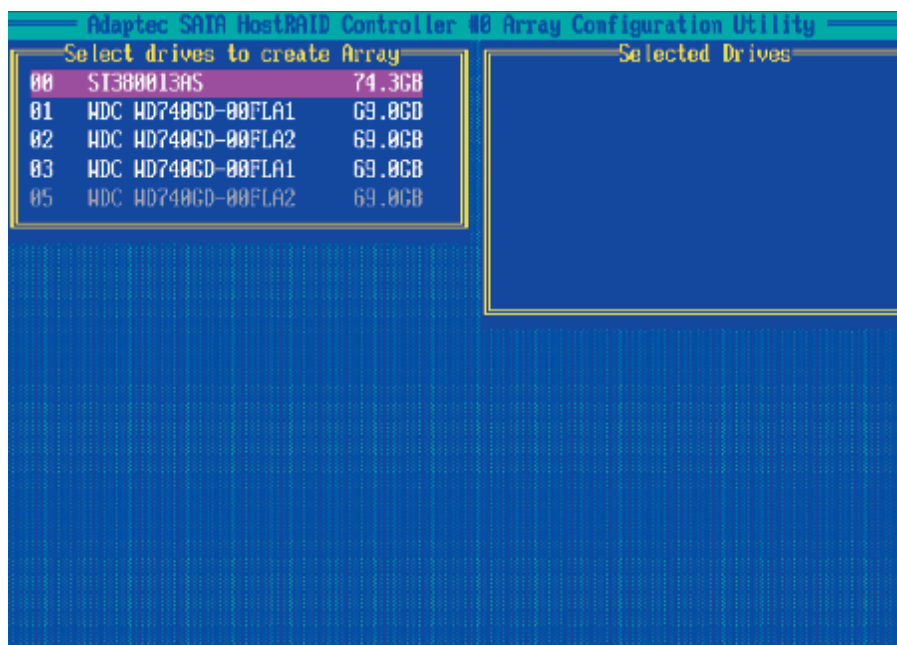
Before you create arrays, make sure that the disks for the array are connected and installed in your system. Note that disks with no usable space, or disks that are un-initialized or not formatted are shown in gray and cannot be used.

Note: It is recommended that you configure devices before you create arrays.

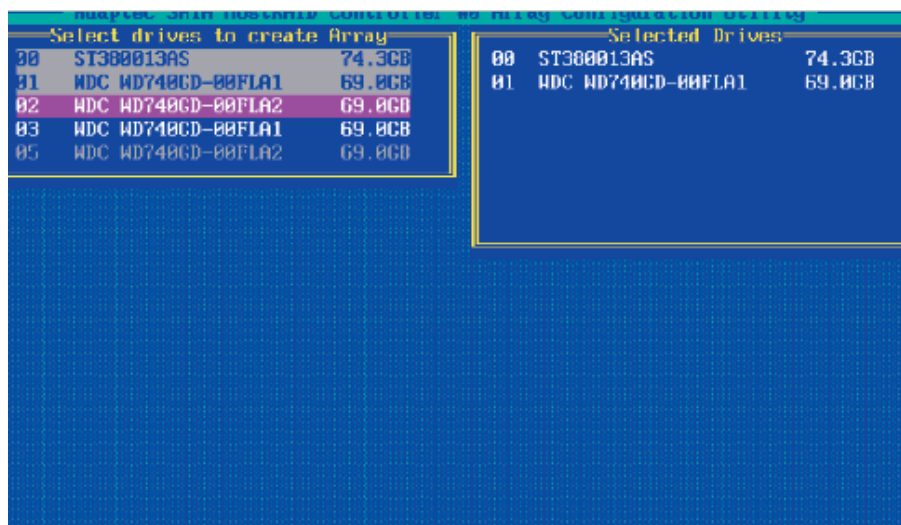
To create an array

1. From the main menu (shown on page D-4), select **Create Array**.
2. Select the disks for the new array and press Insert (as the screen shown below).

Note: To de-select any disk, highlight the disk and press **Delete**.



3. The arrays you have selected will appear on the Selected Drives dialog box on the right (as shown below.)
4. Press **Enter** when both disks for the new array are selected. The Array Properties menu displays.



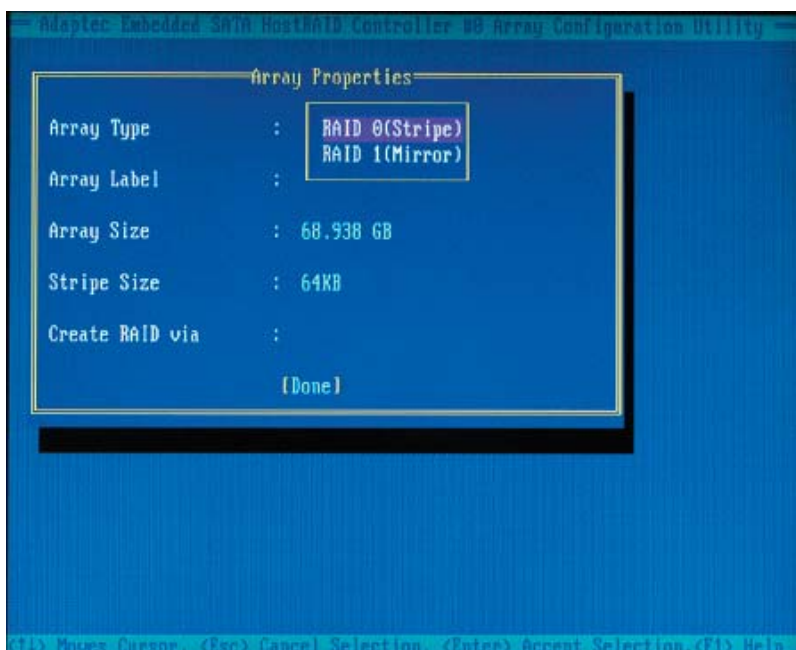
Assigning Array Properties

Once a new array is completed, you can assign properties to the array.

Caution: Once the array is created and its properties are assigned, you cannot change the array properties using this utility.

To assign properties to the new array

1. In the Array Properties menu (shown below), select an array type and press **Enter**. Only the available array types will be displayed on the screen.



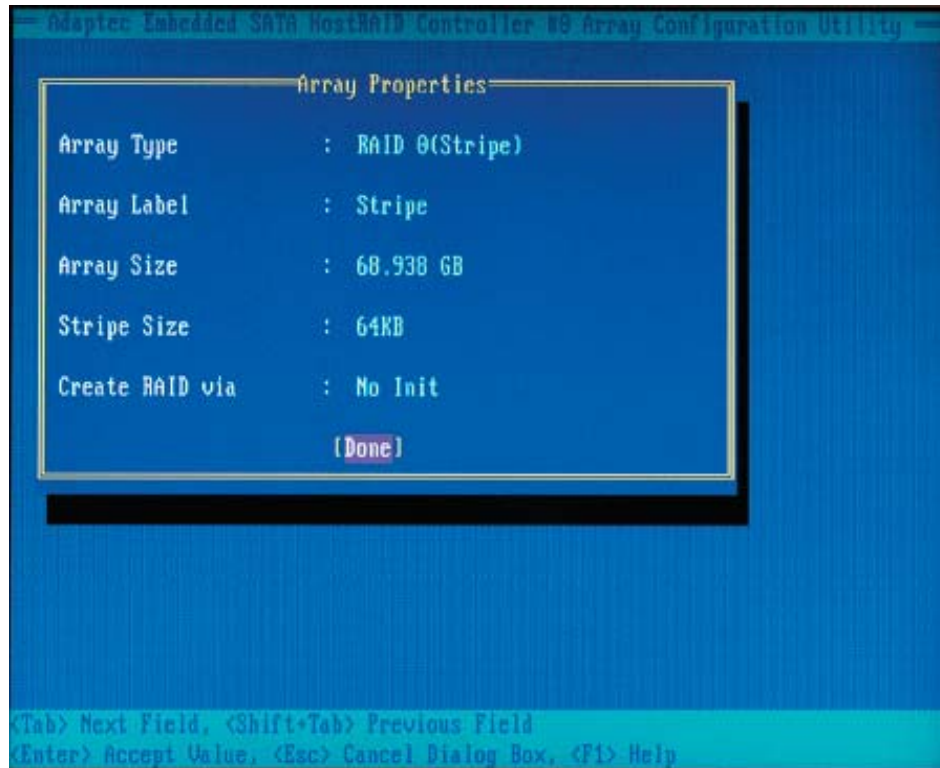
2. Under the item "**Arrays Label**", type in a label and press **<Enter>**. (The label shall not be more than 15 characters.)
3. For RAID 0, select the desired stripe size. (Available stripe sizes are 16, 32, and 64 KB. 64K is default. Please *do not* change the default setting.)
4. The item: "**Create RAID via**" allows you to select between the different ways of creating methods for RAID 0 and RAID 1.

The following table gives examples of when each is appropriate.

| Raid Level | Create Via | When Appropriate |
|-----------------|------------|--|
| RAID 0 | Quick Init | Creating a RAID 0 on new drives |
| RAID 0 | Migrate* | Creating a RAID 0 from one new drive and one drive with data you wish to preserve |
| RAID 1 | Build* | Any time you wish to create a RAID 1, but especially if you have data on one drive that you wish to preserve |
| RAID 1, RAID 10 | Clear | Creating a RAID 1 or RAID 10 on new drives, or when you want to ensure that the array contains no data after creation. |
| RAID 1, RAID 10 | Quick Init | Fastest way to create a RAID 1 or RAID 10 Appropriate when using new drives |

Note: If you select Migrate for RAID 0, or Build for RAID 1, you will be asked to select the source drive. The contents of the source drive will be preserved. However, the data on the new drive will be lost.

5. When you are finished, press **<Done>** (as the screen shown below).



Notes

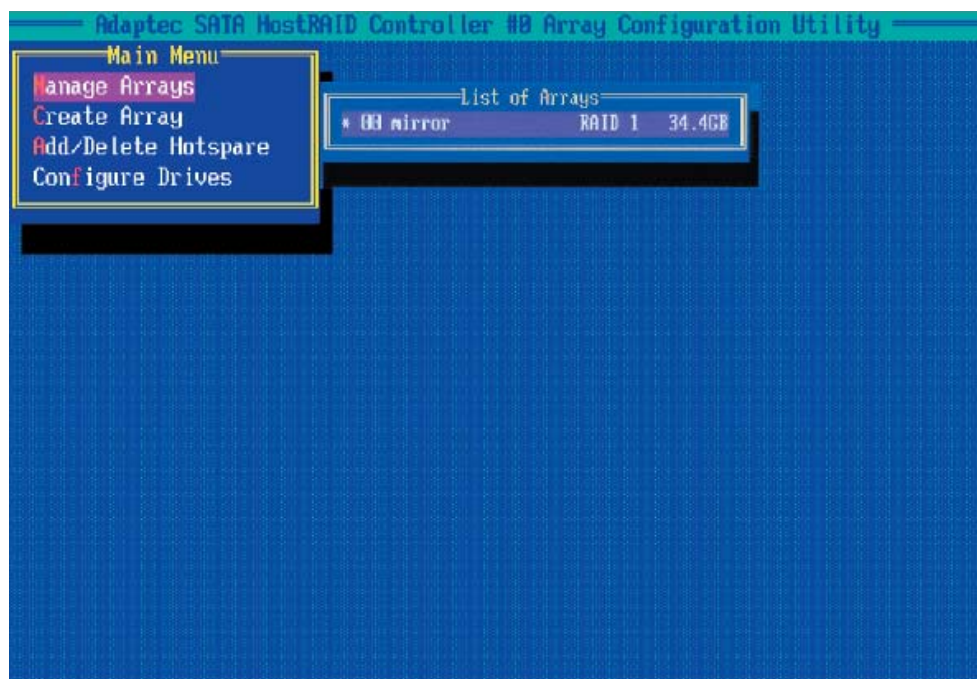
1. Before adding a new drive to an array, be sure to back up any data stored on the new drive; otherwise, all data will be lost.
2. If you stop the Build or Clear process on a RAID 1, you can restart it by pressing **<Ctrl>** and **<R>**.
3. If you've used the Quick Init option to create a RAID1, it may return some data mis-comparison when you run a consistency check at a later time. This is normal.
4. The Adaptec Host RAID allows you to use drives of different sizes in a RAID. However, you can only select a smaller drive as the source or first drive during a build operation.
5. When migrating from single volume to RAID 0, migrating from a larger drive to a smaller drive is allowed. However, the destination drive must be at least half the capacity of the source drive.
6. It is not recommended that you migrate or build an array on Windows dynamic disks (volumes) because it will result in data loss.

Warning: Do not interrupt the process when you create a RAID 0 using the Migrate option. If you do, you will not be able to restart the system, or to recover the data that was on the source drive.

Adding a Bootable Array

To make an array bootable:

1. From the Main menu, select **Manage Arrays**.
2. From the List of Arrays, select the array you want to make bootable, and press **<Ctrl>** and ****.
3. Enter Y to create a bootable array when the following message is displayed: "This will make all other existing bootable array non-bootable. Do you want to make this array bootable? (Yes/No):" Then, a bootable array will be created. An asterisk will appear next to the bootable array (as shown in the picture below:)



Deleting a Bootable Array

To delete a bootable array:

1. From the Main menu, select **Manage Arrays**.
2. From the List of Arrays, select the bootable array you want to delete, and press **<Ctrl>** and ****. Note: a bootable array is the array marked with an asterisk (as shown in the picture above.)
3. When the following message is displayed: "The array is already marked bootable. Do you want to make this array as not bootable? (Yes/No)," Enter Y to delete a bootable array. The bootable array will be deleted and the asterisk will disappear.

Note: Do not use the delete key to delete the bootable array.

Adding/Deleting Hotspares

To add a hotspare:

Note: In order to rebuild a RAID (RAID 0 or RAID 1), you would need to add a new HDD as a hotspare.

1. From the main menu (shown on Page D-4), select Add/Delete Hotspares.
2. Use the up and down arrow keys to highlight and select the disk you want to designate as a hotspare, and press <Insert>, and then, press <Enter>.
3. Press **Yes** when the following prompt is displayed:

"Do you want to create spare?" (Yes/No?)

The spare you have selected will appear in the Selected drives Menu.

To delete a hotspare:

1. From the main menu (shown on Page D-4), select Add/Delete Hotspares.
2. Use the up and down arrow keys to highlight and select the Hotspare you want to delete, and press <delete>, and then, press <Enter>.
3. When the following warning is displayed: "Do you want to delete the hot spare?" (Yes/No?), press **Yes** to delete the hotspare you have selected.

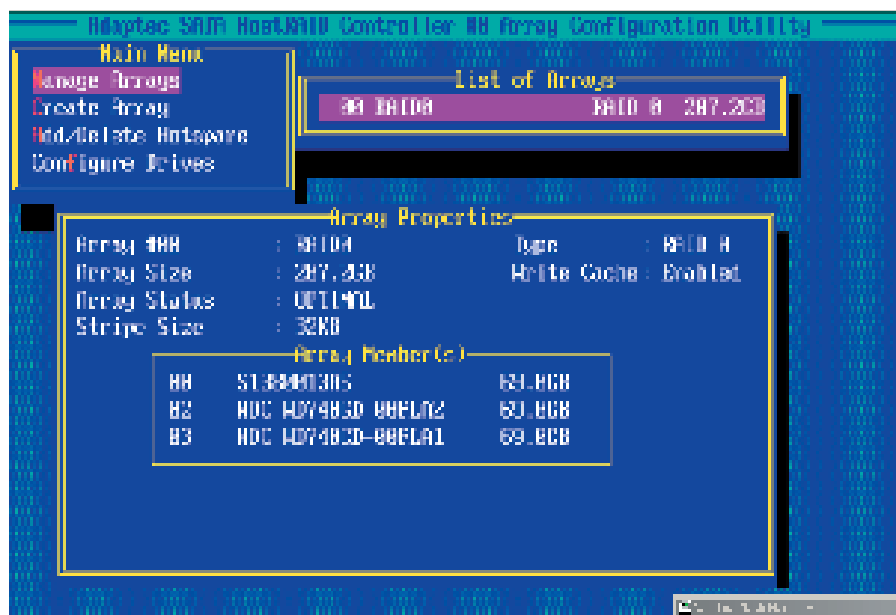


Viewing Array Properties

To view the properties of an existing array:

1. From the main menu, select **Manage Arrays** and hit <Enter> (as shown on the previous page.)
2. From the List of Arrays dialog box (shown below), select the array you want to view and press **Enter**.

The Array Properties dialog box appears (as shown below), showing detailed information on the array. The physical disks associated with the array are displayed here.



3. Press **Esc** to return to the previous menu.

Rebuilding Arrays

Notes: Rebuilding applies to Fault Tolerant arrays (RAID 1) only.

If an array build process is interrupted or when one critical member is missing, you must perform a Rebuild to restore its functionality. For a critical array rebuild operation, the optimal drive is the source drive.

If no spare array exists and a hard disk drive fails, you need to create a spare before you can rebuild an array.

To Rebuild an array

1. From the Main Menu, select **Manage Arrays** (as shown in the screen below). From the List of Arrays, select the array you want to Rebuild.
2. Press <Ctrl> and <R> to Rebuild.



Deleting Arrays

Warning: Back up the data on an array before you delete it to prevent data loss. Deleted arrays cannot be restored.

To delete an existing array:

1. From the main menu (shown on Page D-4), select **Manage Arrays**.
2. Select the array you wish to delete and press <delete>.
3. In the Array Properties dialog box, select **Delete** and press <Enter>. The following prompt is displayed:

Warning!! Deleting the array will render array unusable. Do you want to delete the array? (Yes/No):

RAID 1 only—the following prompt is also displayed:

Deleting the partition will result in data loss! Do you also want to delete the partition? (Yes/No):

4. Press **Yes** to delete the array and partition or **No** to return to the previous menu.
5. Press **Esc** to return to the previous menu.

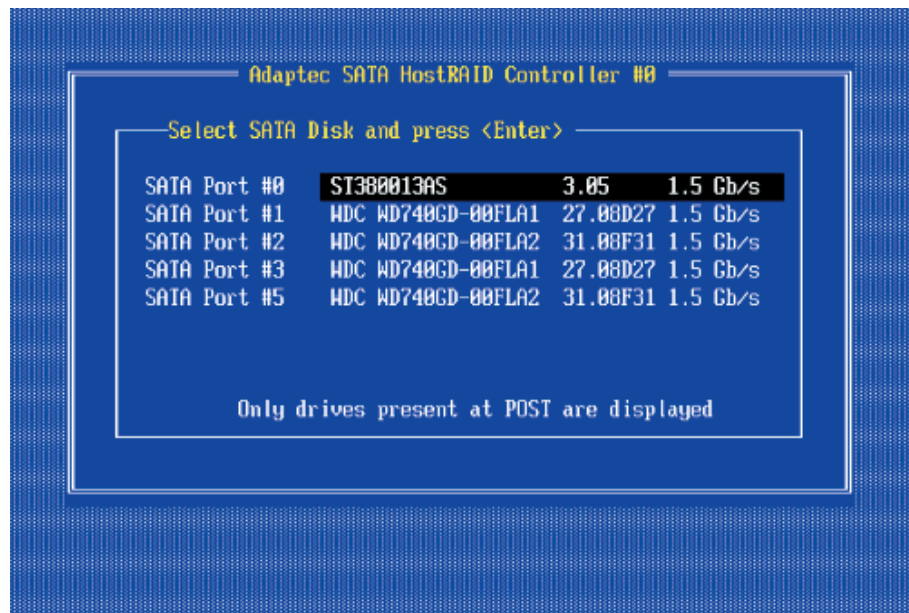
Using the Disk Utilities

The Disk Utilities enable you to format or verify the media of your Serial ATA hard disks.

To access the disk utilities



1. From the Adaptec RAID Configuration Utility Menu, select **Disk Utilities** (as shown above) and press **<Enter>**. The following screen appears.

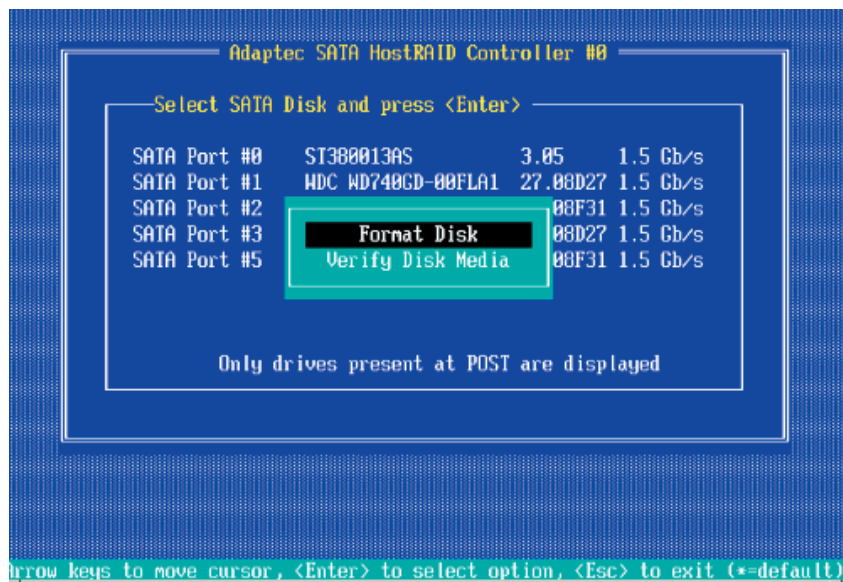


2. Select the desired disk and press **<Enter>**. The following screen appears:

To format a disk

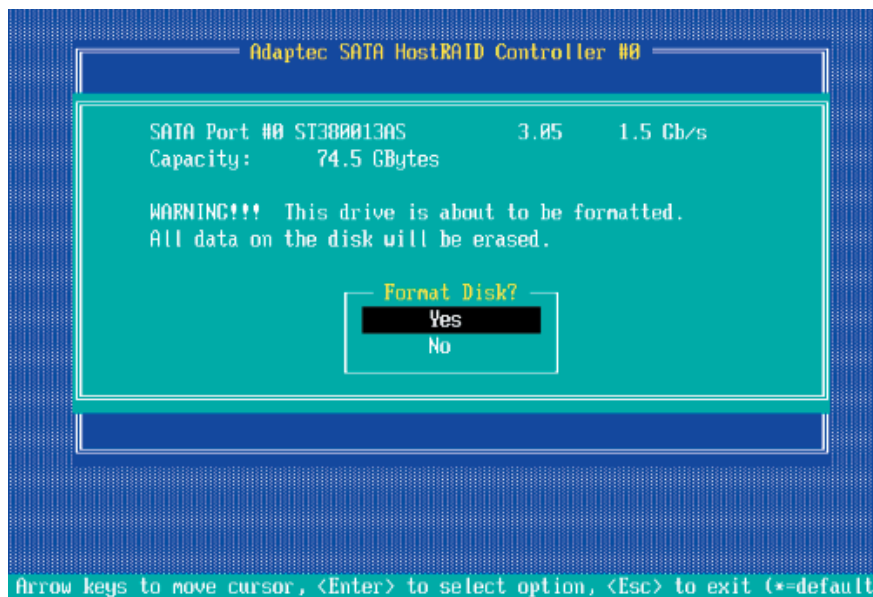
Note: The **Formatting Disk** operation allows you to perform a low-level formatting of a hard drive by writing zeros to the entire disk. Serial ATA drives are low-level formatted at the factory and do not need to be low-level formatted again.

1. When the screen shown below displays, select **Format Disk** and press **<Enter>**. The following screen appears:

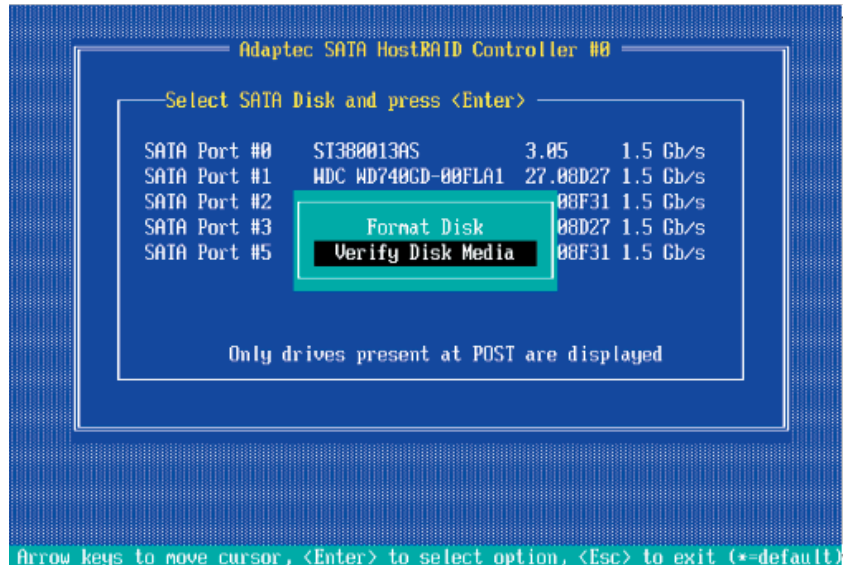


2. Read the warning message when it appears in the screen as shown below. To continue with disk formatting, select **Yes** and hit **<Enter>**. Otherwise, select **No** and press **<Enter>**.

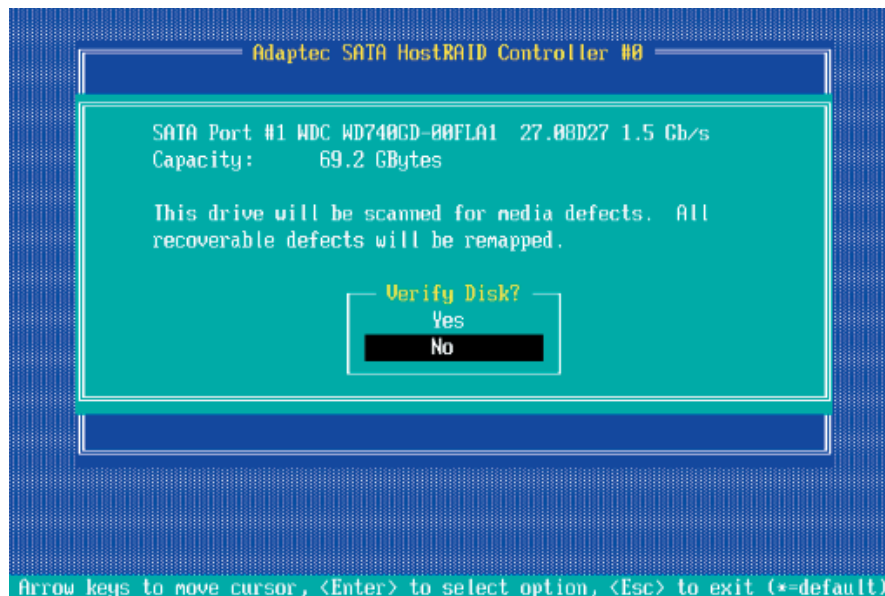
Caution: Formatting a disk destroys all data on the drive. Be sure to back up your data before formatting a disk.



To verify disk media

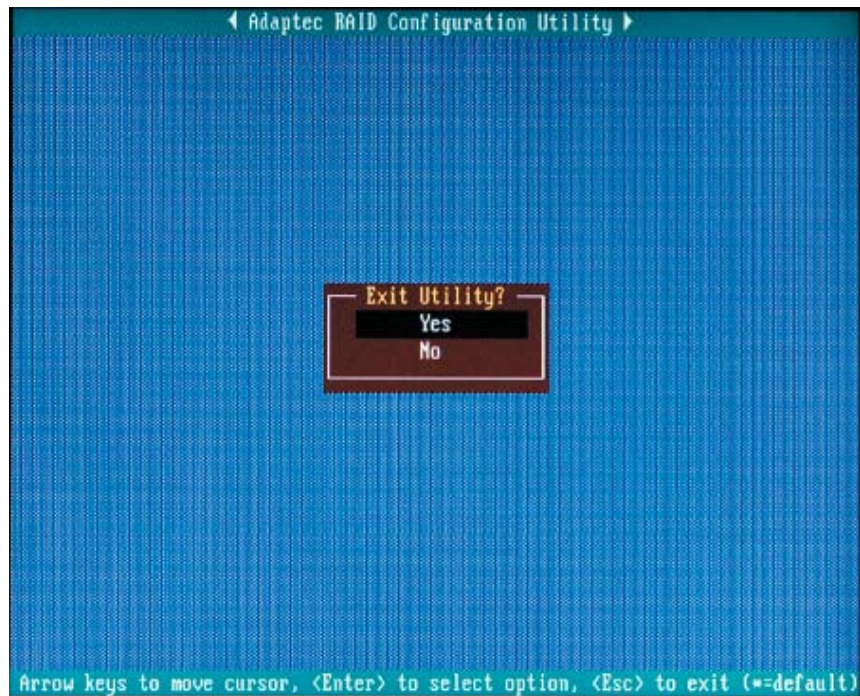


1. When the screen shown above displays, select **Verify Disk Media** and press **<Enter>**.
2. A message will display, indicating that the selected drive will be scanned for media defects. Select **Yes** and hit **<Enter>** to proceed with disk verifying; otherwise, select **No** and hit **<Enter>**.



To Exit the Adaptec RAID Configuration Utility

1. Once you have completed RAID array configurations, press **ESC** to exit. The following screen will appear.
2. Press **Yes** to exit the Utility.



D-2 Installing the Adaptec ICH7R Driver and the OS

1. Insert Supermicro's bootable CD that came with the package into the CD Drive during the system reboot, and the screen: "Super Micro Driver Diskette Maker" will appear.
2. Choose from the list "Intel ICH7R Driver by 3rd Party (Adaptec)" and press **<ENTER>**.
3. From the next screen displayed, choose the OS driver you want to install and press **<Enter>**.
4. Insert a formatted diskette into drive A: and press **<Enter>** as prompted.
5. Exit the program after the process is completed. Then, reboot the system.
6. Insert the Microsoft Windows OS Setup CD in the CD drive, and the system will start to boot up from the CD.
7. Press the **<F6>** key when the message "Press F6 if you need to install a third party SAS or RAID driver" displays.
8. When the Windows OS Setup screen appears, press **"S"** to specify additional device(s).
9. Insert the driver diskette-"Adaptec Embedded Serial ATA Raid Controller Driver" into Drive A: and press the **<Enter>** key.
10. Choose The Adaptec Embedded Host Serial ATA Raid Controller from the list indicated in the Windows OS Setup Screen, and press the **<Enter>** key.
11. Press the **<Enter>** key to continue the installation process. (If you need to specify any additional devices to be installed, do it at this time.) Once all devices are specified, press the **<Enter>** key to continue with the installation.
12. From the Windows OS Setup screen, press **<Enter>**. The OS Setup will automatically load all device files, and, then, continue with the Windows OS installation.
13. After Windows OS Installation is completed, the system will automatically reboot.

Appendix E

System Specifications

Processors

Single 775-pin Intel® Xeon® 3000 Series, Pentium® D, Pentium Extreme Edition, Pentium 4, and Celeron D processors at a FSB speed of 1066/667/533 MHz

Note: Please refer to our web site for a complete listing of supported processors.

Chipset

Intel 3010 chipset

BIOS

8 Mb Phoenix® Flash ROM

Memory Capacity

Four 240-pin DIMM sockets supporting up to 8 GB of unbuffered ECC/non-ECC DDR2-667/533/400 SDRAM (interleaved or non-interleaved)

See the memory section in Chapter 5 for details.

SATA Controller

Intel ICH7R on-chip controller for Serial ATA (RAID 0, 1 5 and 10 supported)

SATA Drive Bays

Four (4) hot-swap drive bays to house four (4) SATA drives

Peripheral Drive Bays

One (1) slim DVD-ROM drive

Expansion Slots (provided with included riser cards)

5015M-UR/5015M-U

Right side: one PCI-E x4 card

Left side: a UIO card and one PCI-E x8 card

5015M-NTR/5015M-NT:

Right side: one PCI-E x4 card

Left side: two PCI-E x8 cards. (See section 5-6 for details.)

Serverboard

PDSMU (Extended ATX form factor)

Dimensions: 12 x 13.05 in (305 x 331 mm)

Chassis

5015M-UR/5015M-NTR: SC815TQ-R450U Form Factor: 1U rackmount

5015M-U/5015M-NT: SC815TQ-560U Form Factor: 1U rackmount

Dimensions: (WxHxD) 17 x 1.7 x 25.6 in. (432 x 43 x 650 mm)

Weight

Gross (Bare Bone): 45/42 lbs. (20.5/19.1 kg.)

System Cooling

Three (3) 4-cm heavy-duty counter-rotating fans

System Input Requirements

5015M-UR/5015M-NTR:

AC Input Voltage: 100-240 VAC

Rated Input Current: 6.3A (115V) to 3.24A (230V)

Rated Input Frequency: 50-60 Hz

5015M-U/5015M-NT:

AC Input Voltage: 100-240 VAC

Rated Input Current: 8A (115V) to 4A (230V)

Rated Input Frequency: 50-60 Hz

Power Supply

5015M-UR/5015M-NTR:

Rated Output Power: 450W (Model# PWS-451-1R)

Rated Output Voltages: +3.3V (25A), +12V (37A), -12V (0.6A), +5V (25A), +5Vsb (3A)

5015M-U/5015M-NT:

Rated Output Power: 560W (Model# PWS-561-1H20)

Rated Output Voltages: +3.3V (21A), +12V (43.6A), -12V (0.6A), +5V (25A), +5Vsb (3A)

BTU Rating

2387 BTUs/hr (for rated output power of 560W)

2192 BTUs/hr (for rated output power of 450W)

Operating Environment

Operating Temperature: 10° to 35° C (50° to 95° F)

Non-operating Temperature: -40° to 70° C (-40° to 158° F)

Operating Relative Humidity: 8% to 90% (non-condensing)

Non-operating Relative Humidity: 5 to 95% (non-condensing)

Regulatory Compliance

Electromagnetic Emissions:

FCC Class A, EN 55022 Class A, EN 61000-3-2/-3-3, CISPR 22 Class A

Electromagnetic Immunity:

EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4,

EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

Safety:

EN 60950/IEC 60950-Compliant, UL Listed (USA), CUL Listed (Canada), TUV Certified (Germany), CE Marking (Europe)

California Best Management Practices Regulations for Perchlorate Materials:

This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. "Perchlorate Material-special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate"

Notes